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Catalogue of the Tiger Beetles of Canada and the United States

Richard Freitag

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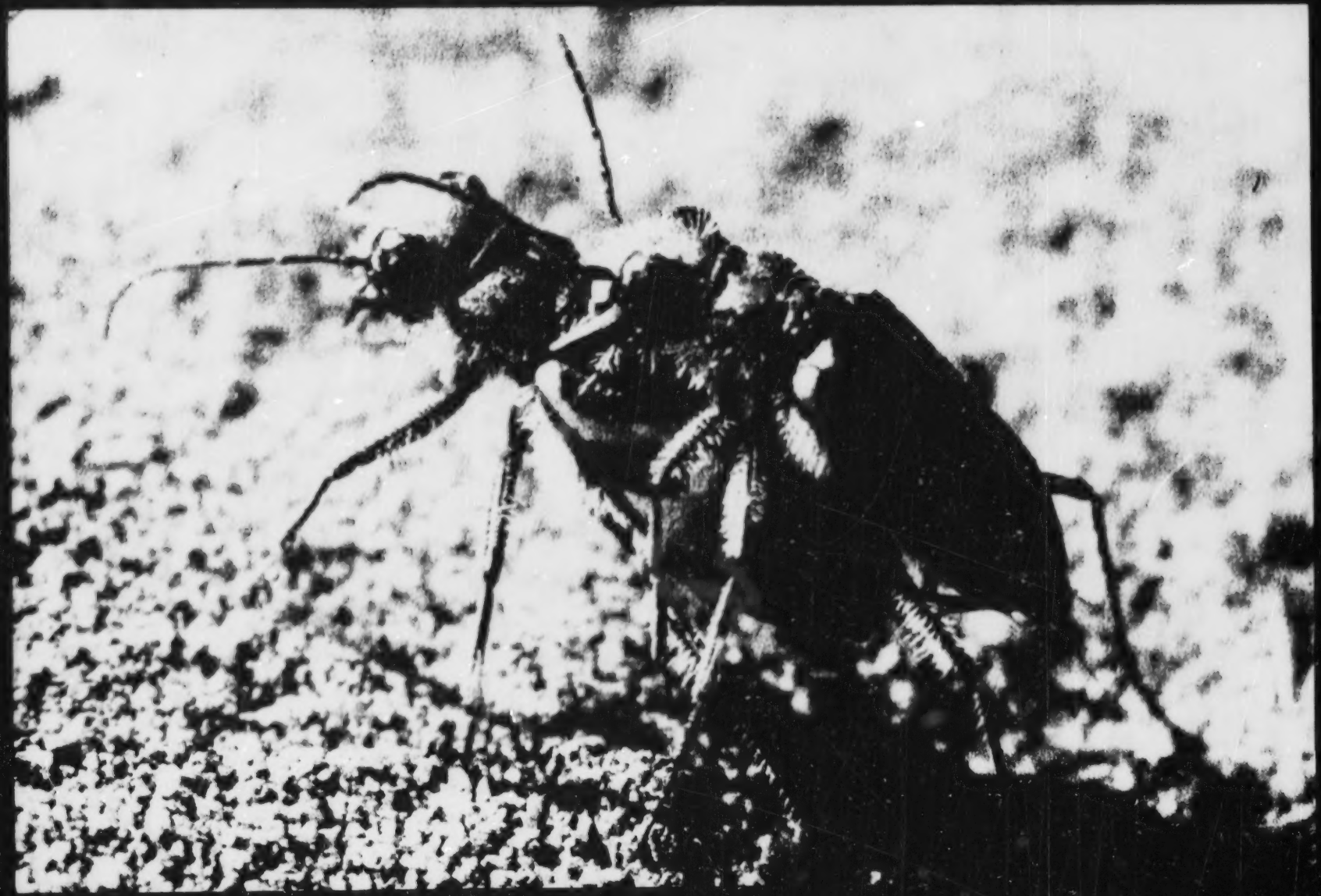
CATALOGUE OF THE TIGER BEETLES OF CANADA AND THE UNITED STATES



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CATALOGUE OF THE TIGER BEETLES OF CANADA AND THE UNITED STATES

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Frontispiece: *Cicindela tranquebarica* Herbst

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Abstract

This catalogue of the tiger beetles (Cicindelidae) of Canada and the United States, contains the currently accepted status of names, taxonomy, geographical distribution of species and subspecies, classifications of recognized taxa, and references to systematics and other biology. The geographical extent of the catalogue includes Canada, the contiguous United States and Alaska, and their continental islands. Each name is followed by its author, date proposed or published, page number, and figures, if any, of the articles in which the original description appeared. Generic names are followed by the type species, circumstances of designation, explanatory notes, and references to immature stages, taxonomy, redescription, biology, and keys. Specific and subspecific names are followed by the original genus if different from the present placement, original designation, type locality, geographical distribution by province, state, and country or region beyond the designated limits, pertinent comments of the taxonomy, depository of the type specimen and its sex, synonyms, references to immature stages, taxonomy, redescription, and biology, and a short description of the habitat. References are fully documented in a bibliography. A taxa name index and systematic index are included.

Résumé

Le présent catalogue se veut un outil qui facilitera la tâche aux personnes qui devaient jusqu'à ce jour parcourir une grande quantité de documentation pour trouver l'information dont elles avaient besoin pour leurs travaux sur les cicindélidés du Canada et des États-Unis. Le Catalogue rend compte de l'information actuellement reconnue en ce qui a trait aux noms et à la taxonomie des cicindélidés, à la répartition géographique des espèces et sous-espèces et aux classifications des taxons reconnus. On y trouvera aussi des renvois à des documents de classification et taxonomie ainsi qu'à des documents de biologie. La couverture géographique du Catalogue comprend le Canada, les États-Unis (y compris l'Alaska) et les îles continentales. Tous les noms sont suivis de l'auteur, de la date proposée ou publiée, du numéro de page, des figures, le cas échéant, et de l'article dans lequel apparaît la première mention. Les noms génériques sont suivis de l'espèce type, des circonstances de la dénomination, de notes explicatives et de renvois à de la documentation sur les phases immatures, la taxonomie, les nouvelles descriptions, la biologie et les clefs. Les noms d'espèce et de sous-espèces sont suivis du genre d'origine si celui-ci diffère de l'association actuellement acceptée, de la dénomination d'origine, de la localité type, de la répartition géographique dans les provinces, états et pays ou régions dépassant les limites indiquées, de commentaires pertinents sur la taxonomie, de la banque de dépôt du spécimen type avec mention de son sexe, de synonymes, de renvois à de la documentation sur les phases immatures, la taxonomie, les nouvelles descriptions et la biologie ainsi que d'une une courte description de l'habitat. Les renvois sont solidement étoffés dans la bibliographie. On trouvera aussi un index des noms de taxon ainsi qu'un index systématique.

Preface

Catalogues and checklists of North American tiger beetles traditionally follow a format established by W. Horn (1915, 1926), and Leng (1920). Valid names, synonyms and their authors and dates of publication, limited classifications, such as taxa groupings, and geographical distributions of species and varieties, are the essential data. Rivalier's (1954) systematic studies of *Cicindela* strongly influenced the classification of North American taxa. His generic/subgeneric categories are conferred in the comprehensive checklist by Boyd and Associates (1982), and continued by Wiesner (1992), who in addition includes a systematic index and numerous taxonomic publications since W. Horn. Herein the exemplary format of these checklists is retained and combined with elements of *A Catalogue of the Coleoptera of America North of Mexico*, U.S.D.A. Systematic and other biological publications are included, along with the sex and locations of type specimens, comments on names of taxa, and descriptions of the habitats of species and subspecies.

I am greatly indebted to Barbara L. Barnes for many years of inestimable help with seemingly endless literature searches and manuscript preparations. Rosemary A. McNabb and K. Kim Price provided extraordinary assistance with reformatting and typing later drafts of the text, and word processing software problems were ably resolved by P. Lynn Ruxton.

I owe an immense debt of gratitude to particular individuals who over time, through correspondence or in person, expressed their views on systematic issues of North American tiger beetles: Ross H. Arnett, Jr., George E. Ball, Frank M. Beer, Howard P. Boyd, Mont A. Cazier, Robert C. Graves, Ronald L. Huber, Michael Kaulbars, James K. Lawton, Sanford R. Leffler, Robert R. Murray, Norman L. Rumpp, Timothy G. Spanton, William D. Sumlin III, and Donald A. Wilson. Type information was provided by Donald Azuma, Robert Davidson, Terry L. Erwin, Henri Goulet, Lee H. Herman, Gloria N. House, David H. Kavanaugh, Alfred F. Newton, and Walter Wittmer. Several versions of the text were greatly improved as a result of extensive reviews by George E. Ball, Yves Bousquet, who also provided valuable assistance with references of names and authors of higher taxa, Robert C. Graves, David J. Larson, David L. Pearson, who also permitted a preview examination of Pearson et al. 1997, *Distributional maps for North American species of tiger beetles (Coleoptera: Cicindelidae)*, and members of the Editorial Board of *A Catalogue of the Coleoptera of America North of Mexico*, Systematic Entomology Laboratory, Agricultural Research Service, United States Department of Agriculture.

This study was financed by the Natural Sciences and Engineering Research Council of Canada through Grant A-4888.

Introduction

This catalogue proposes to alleviate the frequent, time-consuming literature reviews conducted by investigators of the Cicindelidae of Canada and the United States. It contains the currently accepted status of names, taxonomy, geographical distributions of species and subspecies, classifications of recognized taxa, and references to systematics and other biology. The systematic treatment of group names of all ranks is based solely on published taxonomic data. However, important unpublished information bearing on taxonomic issues and biology is fully referenced. Names of taxa are treated in accordance with the rules of *The International Code of Zoological Nomenclature*. No new taxa, combinations, synonyms, classifications, or names in literature, misidentifications, and misspellings are listed.

The geographical extent of the catalogue includes Canada, the contiguous United States and Alaska, and their continental islands. Country or regional names applied designate extra limital ranges, and new distributional place names are given. The Geographical Abbreviations section contains a list of province and state abbreviations, and their respective faunal regions. The latter is indicated as a diagonal line between the distributional abbreviations for species, subspecies and synonyms.

Group names of genera and higher ranks are arranged phylogenetically. Species and subspecies group names are arranged alphabetically, and synonyms are arranged chronologically. References are arranged alphabetically by author surname for all sections.

Each name is followed by its author, date proposed or published, page number, and figures if any, of the article in which the original description appeared. Generic names are followed by the type species, circumstances of designation, explanatory notes, and references to immature stages, taxonomy, redescription, biology, and keys.

Specific and subspecific names are followed by the original genus if different from the present placement, original designation, type locality, geographical distribution by province, state, and country or region beyond the designated limits, pertinent comments of the taxonomy, depository of the type specimen and its sex, synonyms, references to immature stages, taxonomy, redescription, and biology, and a short description of the habitat.

Museums and Private Collections

AMNH	American Museum of Natural History, NY
ANSP	Academy of Natural Sciences, Philadelphia, PA
BMNH	British Museum (Natural History), London
CASC	California Academy of Sciences, San Francisco
CMNH	Cincinnati Museum of Natural History, OH
CNCI	Canadian National Collections, Ottawa
CRBR	Reverend Bernard Rotger Collection; Ronald L. Huber Collection, Prairie Village, KS
CUIC	Cornell University, Ithaca, NY
FSCA	Florida State Collection of Arthropods, Gainesville
ICCM	Carnegie Museum, Pittsburgh, PA
INHS	Illinois Natural History Survey, Urbana
IPZE	Institut Pflanzenschützforschung Zweigstelle, Eberswald, Germany
MCZC	Museum of Comparative Zoology, Harvard University, Cambridge, MA
MNHP	Museum National d'Histoire Naturelle, Paris
OSEC	Oklahoma State University, Stillwater
OSUO	Oregon State University, Corvallis
SEMC	Snow Museum, University of Kansas, Lawrence
TXME	Texas Museum of Entomology, Pipe Creek
USNM	U.S. National Museum of Natural History, Washington, DC

Abbreviations of geographical regions, provinces, and states*

Arctic
AK Alaska
YT Yukon Territory
NT Northwest Territories

Pacific Northwest
BC British Columbia
WA Washington
OR Oregon
ID Idaho

Prairie
AB Alberta
SK Saskatchewan
MB Manitoba
MT Montana
ND North Dakota
SD South Dakota

Laurentian
MN Minnesota
WI Wisconsin
MI Michigan
ON Ontario
PQ Quebec

Maritime
NB New Brunswick
PE Prince Edward Island
NS Nova Scotia
NF Newfoundland
PM St. Pierre-Miquelon

Californian
CA California
NV Nevada

Mountain
WY Wyoming
UT Utah
CO Colorado

Middle States
NE Nebraska
KS Kansas
IA Iowa
MO Missouri
IL Illinois
IN Indiana
OH Ohio
KY Kentucky

Middle Atlantic
NY New York
PA Pennsylvania
NJ New Jersey
DE Delaware
MD Maryland
DC District of Columbia
WV West Virginia
VA Virginia

New England
ME Maine
NH New Hampshire
VT Vermont
MA Massachusetts
RI Rhode Island
CT Connecticut

Southwest
AZ Arizona
NM New Mexico
TX Texas
OK Oklahoma

Southeast
AR Arkansas
LA Louisiana
MS Mississippi
AL Alabama
TN Tennessee
GA Georgia
SC South Carolina
NC North Carolina
FL Florida

*Within the geographical regions, provinces, and states are generally arranged from north to south and west to east.

A note on tiger beetle systematics

Cicindelids and carabids are so much alike that most systematists conclude they are members of the same clade. Considering their similar habitus, and also the remarkable genitalic similarities that exist among primitive tiger beetle genera and *Calosoma* of the Carabini (personal observation), combining the two groups, as some have, seems a valid concept based on cladistic principles alone. The tiger beetles, however, also represent a grade (Mayr and Ashlock, 1991), one well in advance of ground beetle taxa, and expressed particularly by the uniform morphotype and unique life style of the larva. The taxonomic instability of tiger beetles in relation to ground beetles is undoubtedly linked to the level of importance authors have given to the clade or grade concepts. Published taxonomic rankings of the cicindelid group range from a family to supertribe within the Carabidae.

In this catalogue the tiger beetle group is proposed as a sister lineage of the ground beetle group, and taxonomically distinguished by family status. Also Rivalier's (1954) genera of his dismembered *Cicindela* are treated as subgenera of *Cicindela* because of their smaller degree of distinctiveness relative to that among other cicindelid genera.

Some important publications are Arnett (1963), Ball's (1979) exhaustive history of caraboid systems, Crowson (1968), Erwin and Sims (1984), W. Horn (1915), Kryzhanovskiy (1976a), Lindroth (1961–1969), and Rivalier (1954).

Family CICINDELIDAE Latreille 1802: 77

Cicindelidae, the often brightly coloured, predacious tiger beetles, live in open places in forests, grasslands, deserts, footpaths, gravel pits, unpaved roads and roadsides. These beetles also live beside streams, rivers, sloughs, ponds, lakes, and ocean beaches. They prefer sand, gravelly or sandy loam to clay, and alkaline, saline, or slightly acidic soils. Some tropical species are arboreal.

Adults of *Cicindela*, the largest genus, are rapid runners and most fly well; an insect net is usually required to capture them. Active mainly on warm, sunny days, adults are recognized by their short, direct runs with brief stops for food and drink. They rest under litter or dig shallow burrows for overnight shelters or to avoid midday heat. The adults of *Amblycheila, Omus,* and *Megacephala* are nocturnal, and except for the megacephalans, they move relatively slowly.

In characteristic preparation for mating, the male rushes the female, mounts her, and with his large mandibles, grips her thorax in front of the elytra. Eggs are laid singly in a pit in the soil; it is enlarged into a vertical burrow by the first-instar larva. Small arthropods are captured at the burrow entrance which is concealed by the head and pronotum of the larva. Three larval stages occupy most of the life cycle, which may take from 1 to 4 years. Pupation occurs in a special pupal cell from which the adult emerges in about 3 weeks.

The eggs of *Cicindela* are ovoid, about 1 mm wide, 2 mm long, and creamy to straw yellow when first laid. The chorion is shiny, but a reticulate pattern appears under high magnification. Eggs adhere to soil because of a sticky covering that may form a stalk on the posterior end (Willis, 1967). The larvae are distinguished by a flattened head and pronotum and two pairs of hooks on the tergum of the fifth abdominal segment that are used to grasp the sides of the burrow (Blatchley, 1910: 27, (fig. 6)). The pupae bear a pair of dorsal tubercles ringed with apical setae on each of the first five abdominal segments that serve to hold the body above the substratum in the pupal cell.

Adults vary in colour, size, shape, and pubescence. Most are iridescent and have distinct colour patterns on the elytra. Adults of some genera are uniformly black. The body length of species ranges from less than 10 to more than 70 mm long. It has a carabidlike shape, and in many species clothed with white setae in specific patterns. The head is large and bears prominent eyes in most groups. The antennae are inserted on the frons above and between the bases of the mandibles; they are filiform, and have 11 segments. The distal 7 segments are pubescent. The mandibles are long and slender with prominent teeth. The pronotum is narrower than the elytra. A groove or pitlike coupling sulcus is commonly present on the mesepisternum of females and is used as a mandibular gripping point for the copulating male. The legs are long and well suited for running. Elytra normally cover the entire length and sides of the abdomen. The flight wings are the carabid type; most species are alate. Six visible abdominal sternites are features of the females, and seven are found in males.

The male genitalia consist of a median lobe and two slender parameres joined at the base by a narrow sclerite. The internal sac of the median lobe usually contains a predominant elongate sclerite, the flagellum, which enters the female spermathecal duct during copulation. The female genitalia form an extrusible capsule, that comprises abdominal sternum 8 and synterga 9 and 10, and it bears a pair of long, bifurcate gonapophyses. The internal genitalia are marked by a ventral sclerite of the bursa copulatrix and a large oviduct sclerite. Sperm transfer to the spermatheca is indirect through a spermatophore.

The following selected references include additions of new names (nn), catalogues (ca), checklists (cl), keys (ke), larvae (la), location of type material (ltm), other biological studies important to tiger beetle systematics (ob), references (ref), revisions (re) and studies dealing with male or female genitalia (mg, fg): Acciavatti, 1980 (ltm); Arndt and Putchkov, 1996/1997 (ob); Arnett, 1946 (ke, genera), 1958 (cl, families), 1963 (ke, re, genera); Ball, 1979 (ob, ref); Blackwelder, 1939 (ca), 1944 (cl, Mex., C. Amer., S. Amer.); Blackwelder and Blackwelder, 1948 (ca); Böving and Craighead, 1931 (la); Boyd, 1978 (re, NJ); Boyd et al., 1982 (cl); Byers and Karren, 1968 (ltm, SEMC); Casey, 1909, 1913, 1916, 1924 (nn), 1914a (re, *Omus*); Cazier, 1954 (re, Mex.); Cicindela (journal), 1969-1998 (ca, cl, fg, ke, la, mg, nn, ob, re); Crowson, 1960, 1968 (ob); Döbler, 1973 (ltm, IPZE); Drew and Van Cleave, 1961 (re, OK); G.A. Dunn, 1986c (ob); Eckhoff, 1939 (re, IA); J.G. Edwards, 1949 (cl, ke, la); Erwin and House, 1978 (ltm, USNM); Erwin and Sims, 1984 (ke, ob); Erwin et al., 1979 (ob, classification, evolution, natural history of carabid beetles); Frank and Curtis, 1979 (ob); Freitag, 1965 (re, *C. maritima* group), 1966, 1972b (fg); Graves, 1963 (re, MI), 1965 (re, ON); Graves and Pearson, 1973 (re, AL, LA, MS); Graves et al., 1988 (re); C.C. Hamilton, 1925 (la); E.D. Harris, 1911 (ca); Hatch, 1953 (re, Pacific northwest); Herman, 1982 (ref); Hoebeke, 1978 (ltm, CUIC); W. Horn, 1910, 1915 (ca, world), 1926 (ca), 1930 (cl), 1938 (ob, drawings of colour markings of elytra); Kaulbars and Freitag, 1993b (re); Knisley and Schultz, 1997 (ke, la, ob, ref); Kryzhanovskiy, 1976a, 1976b (ob); Larochelle, 1978a, d, 1980c, d, e, 1986b (ref); LeConte, 1860 (re, U.S.); Leng, 1902a (re, Canada, U.S.), 1920 (ca, Canada, U.S.); Leng and Mutchler, 1927, 1933 (ca, Canada, U.S.); Lindroth, 1955 (re, NF); Mandl, 1971 (ob); Matthews, 1977 (ob); H. Papp, 1952 (mg, re); Pearson, 1988, 1990 (ob, ref); Rivalier, 1950, 1954, 1955, 1957, 1961, 1963, 1971 (mg, re, world); Schaupp, 1884a (ca); Schincariol and Freitag, 1991 (re); Shelford, 1908 (la), 1917 (ob, colour and colour pattern mechanisms); Spanton, 1988 (re); V.M. Tanner, 1927 (fg); Thiele, 1977 (ob, carabid beetle behavior, ecology, physiology); Valentine, 1973 (ob); van Emden, 1935 (la); Vaurie, 1955 (re, *Amblycheila*); Vidal Sarmiento, 1966a, 1966b (fg); Wallis, 1961 (re, Canada); White, 1975 (ob); Wickham, 1906a (cl); Wiesner, 1992 (ca, world); and Willis, 1967 (ob, re, central U.S.), 1968 (ke).

Subfamily CICINDELINAE Fischer 1821: 37

Tribe MEGACEPHALINI Csiki 1906: 109

Subtribe OMINA Horn, W., 1908 (1915): 8

Genus AMBLYCHEILA Say

Amblycheila Say, 1830: 67 (as genus). Type-species: *Manticora cylindriformis* Say (orig. des.).
Amblycheila Say, 1834: 409 (duplication of *Amblycheila* Say). Type-species: *Manticora cylindriformis* Say (orig. des.).
Amblychila Agassiz, 1846: 16 (unjustified emendation of *Amblycheila* Say). Type-species: *Manticora cylindriformis* Say (automat.).
Chaleposomus Chaudoir, 1861: 337 (as genus; unnecessary replacement name). Type-species: *Manticora cylindriformis* Say (automat.).

IMMATURE STAGES: Böving and Craighead, 1931: 18; Hamilton, C.C., 1925: 69; Horn, W., 1908b: 285, (figs. 1-5); Putchkov and Arndt, 1994: 416; Schaupp, 1879: 23, and 1884a: 74, (pl. 5, fig. 121); Valenti, 1996b: 45; van Emden, 1935: 134; Vaurie, 1955: 6.

TAXONOMY: Arnett, 1946: 6, and 1963: 52; Bousquet, 1993: 2; Bousquet and Larochelle, 1993: 51; Boyd, 1990: 1; Boyd et al., 1982: 1; Drew and Van Cleave, 1961: 106; Fleutiaux, 1886: 4, and 1892: 10; Horn, G.H., 1876a: 233; Horn, W., 1903a: 195, 1903b: 220, 1915: 120, 121, 1926: 51, and 1930: 77; Huber, 1986: 53; Lacordaire, 1843: 95, and 1854: 8; Larochelle, 1980b: 42; Leng, 1902a: 97, 99, and 1920: 39; Madge, 1989: 460; Mateu, 1974: 149; Motschulsky,

1850: V, 5; Shelford, 1906: 5; Sumlin, 1991a: 1; Thomson, 1857: 14; Van Dyke, 1940: 263; Vaurie, 1955: 7, 14; Vogler and Pearson, 1996: 322; Wallis, 1961: 3; Werner, K., 1993: 47; Wiesner, 1992: 37.

REDESCRIPTION: Reiche, 1839: 558; Vaurie, 1955: 7.

BIOLOGY: de Wendler-Funaro, 1969: 16; Horn, G.H., 1876a: 233; Larochelle, 1975a: 1; Lawton, 1972a: 12; Patton, 1879: 260; Pearson, 1988: 128, 135; Vaurie, 1955: 4; Vogler et al., 1997: 6.

KEYS: Arnett, 1946: 2, and 1963: 53; Bertholf, 1983: 7; Dunn, G.A., 1984a: 4; Kippenhan, 1994: 10; Leng, 1902a: 97, 99; Mateu, 1974: 149; Putchkov and Arndt, 1994: 416; Schaupp, 1884a: 73; Sumlin, 1991a: 1; Vaurie, 1955: 14; Willis, 1969b: 4.

baroni Rivers, 1890: 111 (as species). AZ: Pantano (Pima) Co.; AZ: Mex.

TYPE DEPOSITORY: CASC (type no. 0669).

SEX OF TYPE: F.

longipes Casey, 1909: 253 (*Amblychila*) (as subspecies of *A. baroni* Rivers). AZ: Baboquivari Mountains.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

enodis Casey, 1916: 5 (as subspecies of *A. baroni* Rivers). AZ: Cochise Co., Huachuca Mountains, Garces.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

ventricosa Casey, 1924: 1 (as species). AZ: Huachuca Mountains.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 502, (figs. 25-31); Valenti, 1996b: 49.

TAXONOMY: Bousquet and Larochelle, 1993: 52; Boyd et al., 1982: 1; Dunn, G.A., 1985b: 25; Fleutiaux, 1892: 11; Gaumer and Murray, 1972b: 85, (fig. 1); Grinnel, 1914: 68; Harris, E.D., 1911: 64, and 1918a: 116; Harris, E.D. and Leng, 1916: 1; Horn, G.H., 1893: 281; Horn, W., 1903a: 179-196, 1903b: 220, 1904: 97, 1915: 123, (pl. 9, fig. 6), 1926: 52, and 1930: 77; Larochelle, 1977c: 71, and 1986c: 41, 48; Leng, 1902a: 98, 99, and 1920: 39; Leng and Mutchler, 1927: 7, and 1933: 9; Mateu, 1974: 145, 146, 149, (figs. 4, 6); Pearson et al., 1997: 35; Rivers, 1893: 218; Sherman, J.D., 1929: 274; Skinner, 1905: 311, and 1907: 457; Sumlin, 1991a: 1; Vaurie, 1955: 22, (fig. 9); Vogler and Pearson, 1996: 324; Werner, K., 1993: 48, (pl. 7, fig. 43); Wiesner, 1992: 37.

BIOLOGY: Larochelle, 1985: 67, 1987a: 22, and 1987b: 55, 57; Smyth, 1934: 102; Spangler, H.G., 1988: 450; Vaurie, 1955: 6; Wickham, 1899d: 207.

cylindriformis Say, 1823: 139 (*Manticora*) (as species). At the base of the Rocky Mountains; SD/ WY/ CO/ NE KS/ NM TX OK.

IMMATURE STAGES: Böving and Craighead, 1931: 18, 94, (pl. 4, figs. B, D); Drew and Van Cleave, 1961: 105; Hamilton, C.C., 1925: 70, (figs. 4-148); Horn, G.H., 1878: 28; Horn, W., 1913b: 2; Riley, 1878: 315, (fig. 53); Schaupp, 1878b: 5, and 1879a: 1; Valenti, 1996b: 46; Vaurie, 1955: 6.

TAXONOMY: Bousquet and Larochelle, 1993: 52; Boyd et al., 1982: 1; Brous, 1877: 12; Brullé, 1834: 35; Bruner, 1901: 97; Chaudoir, 1860: 337; Cresson, 1861: 7; Drew and Van Cleave, 1961: 103, 106, (fig. 3); Dunn, G.A., 1985b: 25; Fall and Cockerell, 1907: 154; Fleutiaux, 1886: 4, and 1892: 10; Gaumer, 1969b: 24; Gemminger and Harold, 1868: 2; Harris, E.D., 1911: 64, and 1918a: 116; Harris, E.D. and Leng, 1916: 1; Horn, G.H., 1875: 126, and 1893: 281; Horn, W., 1891a: 329, 1903a: 195, 196, 1904: 97, 1915: 123, and 1926: 51; Huber, 1977: 75; Kippenhan, 1990a: 308, and 1994: 10, 12, (fig. 15); Kirk and Balsbaugh, 1975: 12; Knaus, 1899: 38, and 1901: 110; Larochelle, 1979: 13, 1980b: 41, 1986c: 41, and 1987b: 56, 57; LeConte, 1848: 184, and 1854a: 32, 33, (pl. 1); Leng, 1902a: 97, 99, and 1920: 39; Mateu, 1974: 145, 149, (figs. 2, 7); Pearson et al., 1997: 35; Reiche, 1838: 302; Rivers, 1893: 218; Schaupp, 1878b: 5, and 1884a: 74, (pl. 1, fig. 1); Sumlin, 1991a: 1; Thomson, 1857: 14, (pl. III, figs. 3, 3a); Valenti, 1986a: 1; Vaurie, 1955: 14, (fig. 8); Werner, K., 1993: 47, (pl. 6, fig. 39); Wiesner, 1992: 38; Willis, 1970: 7, (fig. 25).

REDESCRIPTION: Leng, 1902a: 97.

BIOLOGY: Anonymous, 1906b: 349; Brous, 1877a: 12, and 1877b: 18; Drew and Van Cleave, 1961: 106; Dunn, G.A., 1980a: 143; Gaumer, 1969b: 24; Gissler, 1879: 233, (pl. 1, figs. 1-14, fig. 10); Howden, 1970: 8; Knaus, 1897: 198, 1900a: 109, and 1901: 110; Lantz, 1905: 252; Larochelle, 1974c: 22, 1975c: 10, 1977c: 70-73, 1978c: 24, and 1987a: 21-33; Laurent, 1897: 226; Leng, 1902a: 98; Meserve, 1936: 270; Popenoe, 1877: 22; Potts, 1943: 85; Riley, 1877: 98, and 1878: 315, (fig. 52); Shelford, 1915b: 242, (fig. 4); Snow, 1877a: 731, 1877b: 16, 1878a: 30, and 1878b: 63; Vaurie, 1955: 5; Wickham, 1899d: 207; Williams, F.X. and Hungerford, 1914: 2; Williston, 1877: 163.

HABITAT: Clay banks beside creeks, rivers or ravines; brow or top of cliffs; face of cliffs or plains back half mile from cliffs (Vaurie, 1955: 5).

hoversoni Gage, 1991a: 1, fig. 1 (as species). TX: Live Oak Co., 16 mi. S. of George West; TX.

TYPE DEPOSITORY: MCZC (type no. 33379).

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 52; Pearson et al., 1997: 35; Sumlin, 1991a: 1; Werner, K., 1993: 48, (pl. 7, fig. 45); Wiesner, 1992: 38.

picolominii Reiche, 1839: 560 (as species). CA: San Francisco Bay; CO/ AZ NM TX.

TYPE DEPOSITORY: IPZE.

SEX OF TYPE: F.

IMMATURE STAGES: Vaurie, 1955: 6.

TAXONOMY: Bousquet and Larochelle, 1993: 52; Boyd et al., 1982: 1; Chaudoir, 1860: 337; Cresson,1861: 7, Dunn, G.A., 1985b: 25; Fleutiaux, 1886: 4, and 1892: 11; Gaumer and Murray, 1972b: 85, (fig. 1); Gemminger and Harold, 1868: 2; Harris, E.D. and Leng, 1916: 1; Horn, G.H., 1875: 126, 1882: iv, 1883: 269, 1887: 208, and 1893: 281; Horn, W., 1891a: 329, 1902b: 385, 1903a: 179-196, 1904: 97, 1915: 123, and 1926: 52; Kippenhan, 1990a: 308, and 1994: 10, 21, (fig. 16); Larochelle, 1986a: 13, 14; LeConte, 1854a: 33, and 1870: 402; Leffler, 1981: 37; Leng, 1902a: 98, 99, and 1920: 39; Mannerheim, 1843: 183; Martin, J.O., 1932: 190; Mateu, 1974: 145, 150, (fig. 3); Motschulsky, 1850: 5; Pearson et al., 1997: 35; Rivers, 1893: 218; Schaupp, 1878: 5; Sumlin, 1991a: 1, (figs. 1, 4); Thomson, 1857: 14; Werner, K., 1993: 47, (pl. 7, fig. 40); Wickham, 1899d: 207; Wiesner, 1992: 38.

REDESCRIPTION: Vaurie, 1955: 17.

BIOLOGY: Cazier, 1939b: 110; Vaurie, 1955: 4.

HABITAT: Dry open rocky country (Vaurie, 1955: 6).

schwarzi Horn, W., 1903a: 196. NW. AZ: Truxton Valley, Peach Springs, 5,000 ft.; CA/ UT/ AZ.

utahensis Tanner, V.M., 1951: 47 (as species). UT: Wash Co., Diamond Valley, 15 mi. N. of St.George.

SEX OF TYPE: M.

IMMATURE STAGES: Horn, W., 1908b: 285; Vaurie, 1955: 7.

TAXONOMY: Barnum, 1960: 79; Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993:52; Boyd et al., 1982: 1; Dobler, 1973: 400; Dunn, G.A., 1985b: 25; Harris, E.D., 1918a: 116; Horn, W., 1903a: 196, 1904: 98, 1915: 123, and 1926: 52; Huber, 1986: 53; Larochelle, 1979: 13, 1986a: 13, 14, and 1986c: 41; Leng, 1920: 39; Leng and Mutchler, 1933: 9; Martin, J.O., 1932: 190; Mateu, 1974: 145, 150; Pearson et al., 1997: 35; Putchkov and Arndt, 1994: 416, (fig. 50); Sumlin, 1991a: 1; Tanner, V.M., 1929: 78; Vaurie, 1955: 19; Werner, K., 1993: 48, (pl. 7, fig. 42); Wiesner, 1992: 38.

REDESCRIPTION: Vaurie, 1955: 19, (fig. 9).

BIOLOGY: Barnum, 1960: 79; Cazier, 1939b: 110; Kuster, 1976: 11, and 1979: 297; Kuster and W.G. Evans, 1980: 326; Vaurie, 1955: 4.

HABITAT: Quartz, monzonite and granite of boulder canyon wash in Upper Covington Flat, Joshua Tree National Monument, boulder sand interface and rocky sand crevices (Kuster, 1976: 11).

Genus OMUS Eschscholtz

Omus Eschscholtz, 1829: 4 (as genus). Type-species: *Omus californicus* Eschscholtz (monotypy).

Megomus Casey, 1914a: 1 (as subgenus). Type-species: *Omus dejeanii* Reiche (orig. des.).

Leptomus Casey, 1914a: 1 (as subgenus). Type-species: *Omus submetallicus* Horn, G.H. (orig. des.).

IMMATURE STAGES: Böving and Craighead, 1931: 18; Hamilton, C.C., 1925: 65; Leffler, 1985b: 53; Putchkov and Arndt, 1994: 416; Schaupp, 1884a: 75, (pl. V, fig. 122); Valenti, 1996b: 45; van Emden, 1935: 134.

TAXONOMY: Arnett, 1946: 6, and 1963: 52, 53, (fig. 2.3); Beaulieu, 1900: 136; Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 52; Boyd, 1990: 1; Boyd et al., 1982: 2; Brullé, 1834: 33; Casey, 1897: 288, 1909: 254, and 1913: 1; Cazier, 1942: 1; Fleutiaux, 1886: 5, and 1892: 9; Gray, 1832: 263; Harris, E.D., 1914a: 78; Hatch, 1938: 231, and 1953: 36; Horn, G.H., 1876a: 234; Horn, W., 1915: 120, 123, 431, 443, 1926: 53, and 1930: 77; Lacordaire, 1843: 96, and 1854: 8; Larochelle, 1977c: 71, and 1986c: 40; Leach, 1948: 1; LeConte, 1848: 184; Leffler, 1979a: 178; Leng, 1902a: 99, and 1920: 39; Madge, 1989: 466; Motschulsky, 1850: V, 5; Nicolay, 1934: 128; Putchkov and Arndt, 1994: 416; Schaupp, 1883-1884: 75; Shelford, 1906: 5; Thomson, 1857: 15, (pl. III, figs. 4a-d); Van Dyke, 1929: 562, and 1940: 263; Vogler and Pearson, 1996: 322; Wallis, 1961: 3, 10, 69; Wiesner, 1992: 38.

REDESCRIPTION: Reiche, 1838: 298.

BIOLOGY: Altaba, 1991: 102; Horn, W., 1902b: 378, and 1915: 123; Larochelle, 1974c: 35, and 1978c: 24; Lawton, 1972a: 12; Pearson, 1988: 128, 135; Reinick, 1902: 95; Sumlin, 1991a: 1; van den Berghe, 1990: 61; Vogler et al., 1997: 6; Wallis, 1961: 6.

KEYS: Arnett, 1946: 2, and 1963: 53; Casey, 1914a: 1; Dunn, G.A., 1984a: 4, and 1985c: 18; Hatch, 1953: 36; Leng, 1902a: 97, 100; Putchkov and Arndt, 1994: 416; Schaupp, 1884a: 73, 75; Wallis, 1961: 10; Willis, 1969b: 4.

audouini Reiche, 1838: 300 (as species). Western slope of the Rocky Mts. of N. America; BC WA OR/ CA.

ambiguus Schaupp, 1884b: 121 (as species). CA: Mt. Shasta District; CA.
SEX OF TYPE: M.

vandykei Horn, W., 1903a: 185 (as subspecies of *O. audouini* Reiche). Mittel-Oregon.

borealis Casey, 1909: 256 (as species). OR.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

humeroplanatus Horn, W., 1910: 293 (as subspecies of *O. californicus* Eschscholtz). CA: Provincia Del Norte.
TYPE DEPOSITORY: MNHP.
SEX OF TYPE: M.

parvulus Casey, 1913: 2 (as subspecies of *O. audouini* Reiche). OR.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

oregonensis Casey, 1913: 2 (as species). OR: Josephine Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

rugipennis Casey, 1914a: 3 (as species). Northern California.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

solidulus Casey, 1914a: 3 (as species). CA: Siskiyou Co., Shasta Retreat.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

brevicornis Casey, 1916: 8 (as subspecies of *O. audouini* Reiche). CA: Humboldt Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

aequicornis Casey, 1916: 9 (as subspecies of *O. audouini* Reiche). CA: Josephine Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

tacomae Casey, 1916: 9 (as subspecies of *O. audouini* Reiche). WA: Tacoma.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

delicatulus Casey, 1916: 9 (as subspecies of *O. audouini* Reiche). OR.
TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

distans Casey, 1916: 10 (as subspecies of *O. audouini* Reiche). WA: Seattle.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

humeralis Casey, 1916: 10 (as subspecies of *O. ambiguus* Schaupp). CA: Humboldt Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

thoracicus Casey, 1916: 11 (as species). OR: Klamath Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

audens Casey, 1924: 3 (as subspecies of *O. cephalicus* Casey). WA: Seattle.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

socius Casey, 1924: 4 (as subspecies of *O. ambiguus* Schaupp). CA: Shasta Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

IMMATURE STAGES: Hamilton, C.C., 1925: 66, 67, (figs. 47, 86, 121); Leffler, 1979a: 70, (fig. 7A), and 1985b: 55; Valenti, 1996b: 47-49.

TAXONOMY: Beaulieu, 1900: 152; Blackwelder, 1939: 7; Blaisdell, 1904a: 107; Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 52; Boyd et al., 1982: 2, 3; Casey, 1897: 289; Cresson, 1861: 8; Fleutiaux, 1892: 10; Gemminger and Harold, 1868: 2; Harris, E.D., 1911: 62; Harris, E.D. and Leng, 1916: 1; Hatch, 1938: 232, (fig. 2), and 1953: 36, (pl. III, fig. 1); Horn, W., 1902b: 383-394, 1903a: 185-198, 1915: 125, 431, 443, 1926: 55, 56, 58, and 1930: 74, (figs. 1-8); Larochelle, 1977c: 73, 1987a: 33, and 1987b: 58; Leffler, 1979a: 192, 1981: 37, 1985a: 39, and 1987: 5; Leng, 1902a: 100, 104, 107, 108, and 1920: 39; Leng and Mutchler, 1927: 7, and 1933: 9; Maser, 1977b: 47; Pearson et al., 1997: 38; Schaupp, 1884a: 75, 76, (pl. 1, fig. 4); Taylor, 1886: 35; Thomson, 1857: 16, (pl. III, figs. 7, 8); Valenti, 1986a: 6; van den Berghe, 1994: 33, (fig. 2); Wallis, 1961: 10, (pl. 1, fig. 2); Werner, K., 1993: 50, (pl. 8, fig. 51); Wickham, 1890: 169, and 1894: 153; Wiesner, 1992: 39; Wright and Coolidge, 1908: 66.

BIOLOGY: Blaisdell and Reynolds, 1917: 52; Cresson, 1861: 8; Edwards, H., 1875: 74; Larochelle, 1975c: 9, and 1980b: 41; Leffler and Pearson, 1976: 23; Maser, 1973a: 21, and 1977b: 47; Maser and Beer, 1971: 52, and 1984: 42, (fig. 4); Pearson et al., 1988: 407, 410, 412; Spangler, H.G., 1988: 450; van den Berghe, 1990: 64; Wickham, 1899d: 208.

HABITAT: Low coastal terrain and coastal bluffs (van den Berghe, 1990: 64).

californicus angustocylindricus Horn, W., 1913a: 348 (as subspecies of *O. californicus* Eschscholtz). CA: northern Lassen Co.; CA. One cotype is deposited in MCZC.
TYPE DEPOSITORY: MNHP.
SEX OF TYPE: M.

cylindricus Casey, 1914a: 4 (unjustified emendation of *angustocylindricus* Horn, W.).

TAXONOMY: Bousquet and Larochelle, 1993: 52; Boyd et al., 1982: 3; Harris, E.D. and Leng, 1916: 2; Horn, W., 1915: 432, 444, 1926: 58, and 1930: 75, (figs. 24, 25); Leffler, 1979a: 213, 221, and 1985a: 40; Leng, 1920: 39; Leng and Mutchler, 1933: 9; Werner, K., 1993: 50, (pl. 8, fig. 55); Wiesner, 1992: 40.

BIOLOGY: van den Berghe, 1990: 66.

HABITAT: Typical open understory of ponderosa pine as well as digger pines (van den Berghe, 1990: 66).

californicus californicus Eschscholtz, 1829: 4 (as species). CA: Cabo de los Reyes; OR/ CA.
SEX OF TYPE: M.

xanti LeConte, 1859: 69 (as species). CA: Fort Tejon.
TYPE DEPOSITORY: MCZC.
SEX OF TYPE: M.

laevis Horn, G.H., 1866: 394 (as species). CA: high Sierras near the head waters of King and Tulé R.
TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1008.2).
SEX OF TYPE: M.

lecontei Horn, G.H., 1872: 143 (as species). CA: near Monterey. One female cotype is deposited in ICCM.
TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1007).
SEX OF TYPE: M.

edwardsii Crotch, 1874: 73 (as species). CA: Lake Tahoe; CA. Two cotypes are deposited in AMNH.
TYPE DEPOSITORY: MCZC (labelled type).

sequoiarum Crotch, 1874: 73 (as species). CA: Calaveras in the Sierra Nevada. A cotype is deposited in AMNH.
TYPE DEPOSITORY: MCZC (labelled type).

hornii LeConte, 1875: 157 (as species). CA: Yosemite.
TYPE DEPOSITORY: MCZC.
SEX OF TYPE: F.

hornianus Horn, W., 1892a: 91 (as species). CA. One male cotype is deposited in ICCM.
TYPE DEPOSITORY: IPZE.
SEX OF TYPE: M.

lugubris Casey, 1897: 290 (as species). CA. One male and female cotype are deposited in ICCM.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

montanus Casey, 1897: 290 (as species). CA: Placer Co. One female cotype is deposited in ICCM.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

punctifrons Casey, 1897: 291 (as species). CA; CA NV.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

confluens Casey, 1897: 291 (as species). CA: coastal regions N. of San Francisco.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

sculptilis Casey, 1897: 292 (as species). CA: coastal regions N. of San Francisco.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

elongatus Casey, 1897: 293 (as species). CA: near San Francisco.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

fuchsi Horn, W., 1903a: 188 (as variety of *O. californicus* Eschscholtz). CA: in or near Monterey Co., S. of San Francisco. A lectotype has not yet been selected. One female cotype is deposited in ICCM.
TYPE DEPOSITORY: ICCM (cotype).

mimus Casey, 1909: 256 (as species). Probably northern CA.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

dunni Casey, 1909: 258 (as species). CA: vicinity of San Francisco.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

regularis Casey, 1909: 258 (as subspecies of *O. dunni* Casey). CA: Monterey Co., Carmel.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

maritimus Casey, 1909: 259 (as subspecies of *O. dunni* Casey). CA: Monterey Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

cribripennis Casey, 1909: 261 (as species). CA: El Dorado Co., Placerville.
TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

lobatus Casey, 1909: 261 (as subspecies of *O. edwardsii* Crotch). CA: Placer Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

brunnescens Casey, 1909: 262 (as subspecies of *O. montanus* Casey). CA: Placer Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

lucidicollis Casey, 1909: 262 (as subspecies of *O. montanus* Casey). CA: Placer Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

degener Casey, 1909: 263 (as subspecies of *O. punctifrons* Casey). CA: Sierra Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

fraterculus Casey, 1909: 263 (as species). CA: Placer Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

collaris Casey, 1909: 265 (as species). CA: Mariposa Co., Wawona.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

compositus Casey, 1909: 265 (as species). CA: Mariposa Co., Wawona.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

tularensis Casey, 1909: 265 (as species). CA: Tulare Co. Davenport, 6,400 ft.; Soldier's Camp, 5,800 ft.; and Colony Mill, 5,415 ft.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

gracilior Casey, 1909: 266 (as subspecies of *O. tularensis* Casey). CA: Tulare Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

sierricola Casey, 1913: 3 (as subspecies *O. lugubris* Casey). CA.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

intermediopronotalis Horn, W., 1913a: 346 (as subspecies of *O. californicus* Eschscholtz). CA: eastern Plumas Co.
TYPE DEPOSITORY: MCZC (cotype).
SEX OF TYPE: FM.

nunenmacheri Horn, W., 1913a: 347 (as subspecies of *O. californicus* Eschscholtz). CA: central Lassen Co. One cotype is deposited in MCZC.
TYPE DEPOSITORY: MNHP.
SEX OF TYPE: F.

vermiculatus Casey, 1914a: 5 (as subspecies of *O. californicus* Eschscholtz). CA: probably near San Francisco.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

pronotalis Casey, 1914a: 10 (unjustified emendation of *intermediopronotalis* Horn, W.).

longitarsis Casey, 1914a: 12 (as subspecies of *O. sequoiarum* Crotch). CA: Calaveras Co., Big Trees.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

temperatus Casey, 1914a: 15 (as subspecies). CA: Tulare Co., Giant Forest.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

opacellus Casey, 1914a: 16 (as subspecies of *O. tularensis* Casey). CA: Tulare Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

shastanicus Casey, 1916: 11 (as species). CA: Shasta Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

cephalicus Casey, 1916: 11 (as subspecies of *O. shastanicus* Casey). CA: Shasta Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

tenuiculus Casey, 1916: 12 (as subspecies of *O. shastanicus* Casey). CA: Shasta Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

semilucens Casey, 1916: 12 (as species). CA: San Francisco Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

diminuens Casey, 1916: 13 (as subspecies of *O. semilucens* Casey). CA: Alameda Co., Leona Heights.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

latipennis Casey, 1916: 13 (as subspecies of *O. californicus* Eschscholtz). CA: Alameda Co., Leona Heights.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

opacipennis Casey, 1916: 13 (as subspecies of *O. sculptilis* Casey). CA: Napa Co., St. Helena.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

lacertus Casey, 1916: 15 (as species). CA: Monterey Co., Carmel.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

laticollis Casey, 1916: 16 (as species). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

difficilis Casey, 1916: 17 (as subspecies of *O. temperatus* Casey). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

mariposae Casey, 1916: 17 (as subspecies of *O. temperatus* Casey). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

sparsellus Casey, 1916: 18 (as subpecies of *O. temperatus* Casey). CA: Mariposa Co., Wawona.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

subsericeus Casey, 1916: 18 (as species). CA: Kaweah.
TYPE DEPOSITORY: USNM.

antennalis Casey, 1916: 19 (as subspecies of *O. collaris* Casey). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

trapezicollis Casey, 1916: 19 (as subspecies of *O. collaris* Casey). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

erraticus Casey, 1916: 20 (as subspecies of *O. collaris* Casey). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

brevis Casey, 1916: 21 (as subspecies of *O. hornii* LeConte). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

propinquus Casey, 1916: 21 (as subspecies of *O. hornii* LeConte). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

asperatus Casey, 1916: 22 (as subspecies of *O. hornii* LeConte). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

granosus Casey, 1916: 22 (as subspecies of *O. hornii* LeConte). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

sinuosus Casey, 1916: 23 (as subspecies of *O. hornii* LeConte). CA: Mariposa Co., Wawona.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

punctatus Casey, 1916: 23 (as subspecies of *O. hornii* LeConte). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

farctus Casey, 1916: 23 (as subspecies of *O. hornii* LeConte). CA: Mariposa Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

marginalis Casey, 1916: 24 (as species). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

remissus Casey, 1916: 25 (as subspecies of *O. tularensis* Casey). CA: Tulare Co.,Colony Mill, 5,400 ft.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

peropacus Casey, 1916: 25 (as subspecies of *O. laevis* Horn, G.H.). CA: Tulare Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

cupreonitens Blaisdell and Reynolds, 1917: 49 (as species). CA: Humboldt Co., Humboldt Bay shore near Arcata. One male syntype (no. 2655) and one female syntype (no. 2656) are in CASC; seven cotypes are in MCZC. Two cotypes (E2001, E2002) are in CMNH.
TYPE DEPOSITORY: USNM (type no. 21355).
SEX OF TYPE: M.

reynoldsi Casey, 1924: 5 (as subspecies of *O. cupreonitens* Blaisdell and Reynolds). CA: Humboldt Co., Arcata, beach.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.
IMMATURE STAGES: Maser, 1977b: 48.

densicollis Casey, 1924: 5 (as subspecies of *O. sculptilis* Casey). CA: Mendocino Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

argutus Casey, 1924: 6 (as subspecies of *O. sculptilis* Casey). CA: Alameda Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

debiliceps Casey, 1924: 6 (as subspecies of *O. mimus* Casey). CA: San Francisco.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

insulsus Casey, 1924: 6 (as subspecies of *O. mimus* Casey). CA: Santa Cruz Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

modicus Casey, 1924: 7 (as subspecies of *O. mimus* Casey). CA: Mendocino Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

stolidus Casey, 1924: 7 (as subspecies of *O. mimus* Casey). CA: Mendocino Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

subparallelus Casey, 1924: 7 (as subspecies of *O. mimus* Casey). CA: Santa Cruz Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

ventricosus Casey, 1924: 8 (as species). CA: Mendocino Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.
leachi Casey, 1924: 8 (as subspecies of *O. ventricosus* Casey). CA: Trinity Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.
pullatus Casey, 1924: 9 (as species). CA: Sonoma Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.
pollens Casey, 1924: 9 (as subspecies of *O. vermiculatus* Casey). CA: Marin Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.
turbulentus Casey, 1924: 10 (as subspecies of *O. californicus* Eschscholtz). CA: Sonoma Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.
aethiops Casey, 1924: 10 (as subspecies of *O. californicus* Eschscholtz). CA: Shasta Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.
sparsus Casey, 1924: 10 (as subspecies of *O. californicus* Eschscholtz). CA: Santa Cruz.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.
callosus Casey, 1924: 12 (as subspecies of *O. hornii* LeConte). CA: Tuolumne Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.
vanlooi Nunenmacher, 1940: 144 (as species). CA: Butte Co.; CA. An allotype is deposited in CASC, and two paratypes (no. 3417) in SEMC.
TYPE DEPOSITORY: CASC (type no. 8164).
SEX OF TYPE: M.

IMMATURE STAGES: Blaisdell, 1904b: 348; Böving and Craighead, 1931: 18, 94, (pl. 4, fig. E); Burdick and Wasbauer, 1959a: 75, and 1959b: 63; Hamilton, C.C., 1925: 66, 68, (figs. 3-120); Leffler, 1979a: 70, (fig. 4A), and 1985b: 55; Leffler and Pearson, 1976: 23; Valenti, 1996b: 47, 49; van Emden, 1935: 175, (fig. 1).

TAXONOMY: Blackwelder and Blackwelder, 1948: 1; Blaisdell, 1892: 47, 1904: 348, 1906: 106, and 1925: 79; Bousquet and Larochelle, 1993: 53; Boyd et al., 1982: 2, 3; Brullé, 1834: 34, (pl. 1, fig. 3); Byers and Karren, 1968: 3; Casey, 1897: 289-293; Cresson, 1861: 7; Döbler, 1973: 384; Edwards, H., 1875: 75; Fleutiaux, 1892: 10; Garnett, 1920: 138; Gemminger and Harold, 1868: 2; Grinnel, 1914: 68; Harris, E.D., 1911: 61-63; Harris, E.D. and Leng, 1916: 1; Hatch, 1953: 36; Hopping, 1904: 260; Horn, W., 1902b: 378-395, 1903a: 185-197, 1913a: 346, 348, 1915: 125, 126, 432, 443, 444, 1926: 54-59, and 1930: 74, (figs. 9-11, 13-23); Kippenhan, 1995b: 57; Larochelle, 1977c: 65-73, 1980b: 41, 1986a: 14, 1986c: 41, 43, and 1987b: 55; Leffler, 1979a: 209, 220, 1985a: 40, and 1987: 3; Leng, 1902a: 99-109, 1917a: 145, and 1920: 39; Leng and Mutchler, 1927: 7, and 1933: 9; Mannerheim, 1843: 182; Motschulsky, 1850: 5; Pearson et al., 1997: 38; Reiche, 1838: 301; Schaeffer, 1904a: 126; Schaupp, 1884a: 75, 76, 77, (pl. 1, figs. 2, 5-10); Sharp and Muir, 1912: 486; Thomson, 1857: 16, (pl. III, figs. 5, 6); van den Berghe, 1994: 33, (fig. 2); Vogler and Pearson, 1996: 324; Wallis, 1961: 10, 69; Ward, 1980: 59; Werner, K., 1993: 49, (pl. 8, fig. 48); Wiesner, 1992: 38-40; Wright and Coolidge, 1908: 66.

BIOLOGY: Burdick and Wasbauer, 1959a: 75, and 1959b: 63; Edwards, H., 1875: 73; Kuster, 1979: 297; Kuster and W.G. Evans, 1980: 326; Larochelle, 1980b: 41, and 1986a: 12; van den Berghe, 1990: 64; Wickham, 1899d: 208.

HABITAT: Under leaves in moist soil of primary and secondary advanced forests (Leffler and Pearson, 1976: 25); along coastline in redwood groves along streams (van den Berghe, 1990: 64).

californicus intermedius Leng, 1902a: 104 (as species). CA: Mariposa Co., Coulterville; CA.
procerus Casey, 1909: 259 (as species). CA: Tulare Co. One cotype is deposited in MCZC.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

blaisdelli Casey, 1909: 260 (as species). CA: Calaveras Co., Mokelumne Hill.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

parvicollis Casey, 1909: 260 (as subspecies of *O. procerus* Casey). CA: Tulare Co., Redwood and Makel Creeks and Watson Springs.

spissipes Casey, 1913: 3 (as species). CA: Tulare Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

ovipennis Casey, 1916: 14 (as subspecies of *O. parvicollis* Casey). CA: Calaveras Co., Mokelumne Hill.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

torvus Casey, 1924: 11 (as subspecies of *O. blaisdelli* Casey). CA: Lampson's Flat, 1,800 ft.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

maurus Casey, 1924: 11 (as subspecies of *O. cribripennis* Casey). CA: El Dorado Co.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

TAXONOMY: Blaisdell, 1925: 80; Blaisdell and Reynolds, 1917: 54; Bousquet and Larochelle, 1993: 53; Boyd et al., 1982: 3; Dahl, 1941: 169; Harris, E.D., 1911: 63; Harris, E.D. and Leng, 1916: 2; Hopping, 1904: 260; Horn, W., 1903a: 189-198, 1915: 126, 432, (pl. 9, fig. 7), 1926: 58, and 1930: 75, (fig. 12); Larochelle, 1986c: 41; Leffler, 1979a: 213, 218, 221, and 1985a: 40; Leng, 1902a: 100, 104, and 1920: 39; Leng and Mutchler, 1927: 7, and 1933: 9; Werner, K., 1993: 51, (pl. 9, fig. 5a); Wiesner, 1992: 40.
BIOLOGY: Leng, 1902a: 105; van den Berghe, 1990: 65.
HABITAT: High Sierra (ca. 1300 m - 2400 m) on western slope of the Sierra Nevada; associated with conifers, particularly giant sequoia (van den Berghe, 1990: 65).

californicus subcylindricus Nunenmacher, 1940: 143 (as species). CA: Santa Clara Co.; CA. An allotype is deposited in CASC; and one paratype (no. 3416) in SEMC.
TYPE DEPOSITORY: CASC (type no. 8165).
SEX OF TYPE: M.
TAXONOMY: Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 53; Boyd et al., 1982: 2; Byers and Karren, 1968: 3; Larochelle, 1986a: 14, 15, and 1987a: 33; Leffler, 1979a: 213, 222, and 1985a: 40; Wiesner, 1992: 39.
BIOLOGY: van den Berghe, 1990: 65.

cazieri van den Berghe, 1994: 33, figs. 1, 2 (as species). OR: Jackson Co., north side Mt. Ashland.
TYPE DEPOSITORY: ICCM.
SEX OF TYPE: M.
TAXONOMY: Pearson et al., 1997: 38.
HABITAT: Pine forest with open understory on Mt. Ashland and surrounding slopes (van den Berghe, 1994: 35).

dejeanii Reiche, 1838: 299 (as species). Western slope of the Rocky Mts. of N. America; BC WA OR.

robustus Casey, 1916: 7 (as subspecies of *O. dejeani* Reiche). WA: King Co., Seattle.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

foveatus Casey, 1916: 8 (as subspecies of *O. dejeani* Reiche). OR: Clackamas Co., Bull Run.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

IMMATURE STAGES: Horn, G.H., 1878: 31, 37; Leffler, 1979a: 100, and 1985b: 56; Leffler and Pearson, 1976: 25; Maser, 1977a: 37; Valenti, 1996b: 46, 48, 49.
TAXONOMY: Arnett, 1993: 286; Beaulieu, 1900: 152; Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 53; Boyd et al., 1982: 2; Cresson, 1861: 7; Fleutiaux, 1892: 9; Gemminger and Harold,

1868: 2; Harris, E.D., 1911: 61; Harris, E.D. and Leng, 1916: 1; Hatch, 1938: 231, (fig. 1), and 1953: 36; Horn, W., 1903a: 185-197, 1915: 124, 1926: 53, 54, and 1930: 77; Knowlton and Wood, 1946: 91; Larochelle, 1980b: 41, and 1986a: 15; Leffler, 1979a: 187, 1981: 37, and 1985a: 39; Leffler and Pearson, 1976: 25; Leffler et al., 1986: 7; Leng, 1902a: 99, 100, 103, 105, and 1920: 39; Leng and Mutchler, 1933: 9; Maser, 1977a: 35; Maser and Beer, 1984: 42, (fig. 3); Pearson et al., 1997: 38; Schaupp, 1884a: 75, 76, (pl. 1, fig. 2); Tanner, V.M., 1927: 10, (figs. 9, 10); Taylor, 1886: 35; Thomson, 1857: 15, (pl. III, fig. 4); Valenti, 1986a: 5; van den Berghe, 1994: 33, (fig. 2); Wallis, 1961: 10, (pl. 1, fig. 1); Wickham, 1890: 169, and 1894: 153; Wiesner, 1992: 38.

BIOLOGY: Edwards, H., 1875: 74; LaBonte and W.N. Johnson, 1988: 53; Larochelle, 1975c: 9, 10; Leffler and Pearson, 1976: 25; Maser, 1973a: 22, and 1977a: 35; Maser and Beer, 1971: 52, and 1984: 42; McCluskey, 1993: 27; Pearson, 1988: 133; Pratt, 1939: 95; Shelford, 1915b: 242, (fig. 5); van den Berghe, 1990: 63; Wickham, 1899d: 208; Willis and Stamatov, 1971: 41.

HABITAT: Moist soil under leaves during day (Leffler and Pearson, 1976: 27); daytime, under logs in forests and often in numbers in very rotten logs (Wickham, 1899d: 208); steep slopes with good tree canopy of alder, maple, red cedar, western hemlock, old growth, virgin forests, logged areas (van den Berghe, 1990: 63).

submetallicus Horn, G.H., 1868: 129 (as species). CA; CA.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1006).

SEX OF TYPE: M.

niger Cazier, 1937a: 94 (as subspecies of *O. submetallicus* Horn, G.H.). CA: Fresno Co., Wartham Canyon; CA. A female allotype is deposited in CASC (no. 4479).

TYPE DEPOSITORY: CASC (type no. 4478).

SEX OF TYPE: M.

IMMATURE STAGES: Leffler, 1985b: 57; Valenti, 1996b: 49.

TAXONOMY: Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 53; Boyd et al., 1982: 2; Casey, 1897: 289; Cazier, 1942: 341; Edwards, H., 1875: 74; Fleutiaux, 1892: 10; Harris, E.D. and Leng, 1916: 1; Horn, W., 1902b: 389-391, 1903a: 185-197, 1915: 125, 1926: 54, and 1930: 77; Larochelle, 1980b: 41, and 1986a: 12; Leffler, 1979a: 181, and 1985a: 37, 39; Leng, 1902a: 101, 104, 109, and 1920: 39; Pearson et al., 1997: 38; Schaupp, 1884a: 75, 76, (pl. 1, fig. 5); Ward, 1980: 58; Werner, K., 1993: 49, (pl. 8, fig. 47); Wiesner, 1992: 38.

BIOLOGY: van den Berghe, 1990: 66; Wickham, 1899d: 208 (type-locality).

HABITAT: Vegetation mainly oak and mistletoe. Meter or two above a narrow intermittent creek (Leffler, 1985a: 41).

Subtribe MEGACEPHALINA Horn, W., 1908 (1915): 8

Genus MEGACEPHALA Latreille

Megacephala Latreille, 1802: 79 (as genus). Type-species: *Cicindela megacephala* Olivier (des. by Latreille 1810: 425; Horn, W., 1915: 432).

IMMATURE STAGES: Putchkov and Arndt, 1994: 416, and 1997: 55; Schaupp, 1884a: 77; Valenti, 1996b: 45.

TAXONOMY: Arnett, 1946: 6, and 1963: 52; Basilewsky, 1966: 5; Blackwelder: 1939: 7; Bousquet and Larochelle, 1993: 54; Boyd, 1990: 1; Boyd et al., 1982: 4; Downie and Arnett, 1996: 78; Drew and Van Cleave, 1961: 106; Dunn, G.A., 1985a: 21; Erwin and Sims, 1984: 366; Gray, 1832: 263; Hope, 1838: 7; Horn, W., 1915: 130, and 1926: 61; Huber, 1994: 69; Knisley and Schultz, 1977: 1-209; Lacordaire, 1843: 100; Leng, 1902a: 109; Madge, 1989: 465; Pearson and Huber, 1995: 1; Sloane, 1906: 317; Thomson, 1857: 18; Vidal Sarmiento, 1966a: 259, and 1966b: 8; Vogler and Pearson, 1996: 322; Wallis, 1961: 3; Westwood, 1852: 49; Wiesner, 1992: 41.

BIOLOGY: Altaba, 1991: 102; Knisley and Schultz, 1997: 1-209; Larochelle, 1974c: 34, and 1974f: 83; Lawton, 1972a: 13; Pearson, 1988: 128, 135.

KEYS: Arnett, 1946: 3, and 1963: 53; Bertholf, 1983: 7; Ciegler, 1997: 179; Dejean, 1825: 4; Downie and Arnett, 1996: 78; Dunn, G.A., 1984a: 4, and 1985a: 21; Kippenhan, 1994: 10; Knisley and Schultz, 1997: 1-209; Leng, 1902a: 97; Pearson and Huber, 1995: 5; Putchkov and Arndt, 1994: 416, and 1997: 55; Rodriquez et al., 1994: 64; Willis, 1969b: 5.

Subgenus TETRACHA Hope

Tetracha Hope, 1838: 7 (as genus). Type species: *Cicindela carolina* Linnaeus (orig. des.).

IMMATURE STAGES: Böving and Craighead, 1931: 18; Hamilton, C.C., 1925: 57; Schaupp, 1884a: 77, (pl. V, fig. 123).

TAXONOMY: Arnett, 1963: 53; Basilewsky, 1966: 5; Bates, 1881: 1; Blackwelder, 1939: 7; Blatchley, 1910: 28; Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 4; Chaudoir, 1850: 6, and 1860: 334; Dillon and Dillon, 1961: 49; Eckhoff, 1939: 202; Edwards, J.G., 1949: 72; Fleutiaux, 1886: 7, and 1892: 19; Hope, 1838: 7; Horn, G.H., 1876a: 234; Horn, W., 1903b: 220, 1915: 140, and 1926: 71; Lacordaire, 1843: 100; Leng, 1902a: 109, and 1920: 40; Leng and Beutenmüller, 1894b: 87; Leng and Mutchler, 1916: 684; Schaupp, 1884a: 77; Shelford, 1906: 5; Thomson, 1857: 22; Van Dyke, 1929: 563; Wagenaar Hummelinck, 1955: 89; Wiesner, 1992: 47.

BIOLOGY: Larochelle, 1978c: 24; Wendler-Funaro, 1969: 17.

KEYS: Dillon and Dillon, 1961: 49; Eckhoff, 1939: 202; Leng, 1902a: 97; Schaupp, 1884a: 73.

affinis angustata Chevrolat, 1841: 1, pl. 55 (as species). Jalapa; TX; Mex.

TAXONOMY: Bates, 1881: 3, (pl. 1, fig. 1); Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 5; Chaudoir, 1860: 336; Cresson, 1861: 9; Darlington, 1935: 161; Dunn, G.A., 1985a: 22; Fleutiaux, 1892: 24; Gemminger and Harold, 1868: 3; Harris, E.D., 1911: 60; Harris, E.D. and Leng, 1916: 3; Horn, W., 1903b: 220, 1907: 265, 1915: 143, and 1926: 77; Horn, W. et al., 1897: 184; Johnson, W.N., 1991: 8; Larochelle, 1980b: 41; Mandl, 1961a: 26; McKown and Shank, 1975: 37; Nidek, 1978: 40; Pearson et al., 1997: 38; Werner, K., 1993: 55.

BIOLOGY: Darlington, 1935: 161; Vogt, 1949: 2.

HABITAT: Adults nocturnal; under street lights at night along a river in Brownsville, TX (Darlington, 1935: 161).

carolina carolina (Linnaeus), 1767: 657 (*Cicindela*) (as species). Carolina; CA NV/ NE KS/ VA/ AZ NM TX OK/ AR LA MS AL GA SC NC FL; Mex., W.I.

carolinensis Latreille, 1806: 175, pl. 6, fig. 9 (as species). Carolina; probable emendation or lapsus.

mexicana Gray, 1832: 263 (as species). Mexico.

maculicornis Laporte, 1834: 29 (as species). Antilles, Cuba.

boisduvalii Gistl, 1837: 7 (as species). Mexico.

virgula Thomson, 1857: 31 (*Tetracha*) (as species). Cuba.

splendida Dokhtouroff, 1882: 46 (*Tetracha*) (as species). Peru.

IMMATURE STAGES: Drew and Van Cleave, 1961: 106; Hamilton, C.C., 1925: 58, 59, (figs. 2-116); Horn, G.H., 1878: 34; Schaupp, 1879a: 1; Valenti, 1996b: 46, 47.

TAXONOMY: Bates, 1881: 1; Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 4; Bruner, 1901: 97; Cartwright, 1935: 69; Cazier, 1948: 5, (fig. 26); Chaudoir, 1860: 334; Choate, 1975: 71; Ciegler, 1997: 179, 184, (fig. 3); Cresson, 1861: 8; Dejean, 1821: 1, 1825: 8, and 1837: 1; Dillon and Dillon, 1961: 50, (pl. 6, fig. 3); Downie and Arnett, 1996: 78; Dozier, 1918: 296; Drew and Van Cleave, 1961: 103, 106, (fig. 5); Dunn, G.A., 1985a: 23, and 1986b: 27; Edwards, J.G., 1949: 73; Elliott and Salbert, 1978: 21; Engelhardt, 1910: 130; Fabricius, 1775: 226, 1781: 286, 1787: 187, and 1801: 233; Fall and Cockerell, 1907: 154; Fattig, 1935: 154; Fernández et al., 1994: 28; Fleutiaux, 1892: 20, 21; Freitag, 1992: 151, 154; Gaumer and Murray, 1971: 9; Gemminger and Harold, 1868: 4; Glaser, 1984: 65; Graves and Pearson, 1973: 159, 160, 165, (fig. 2); Griffith, 1900: 565; Harris, E.D., 1911: 59; Harris, E.D. and Leng, 1916: 3; Horn, G.H., 1866: 397, and 1894: 306; Horn, W., 1903b: 220, 221, 1906: 329, 1915: 140, 141, 1926: 71, 72, and 1930: 79; Horn, W. et al., 1897: 185; Huber, 1986: 53; Hutchings, 1986: 3; Johnson, W.N., 1991: 8, and 1993a: 13, 20, (fig. 1); King, B.L., 1988: 43; Kirk, 1969: 7, and 1970: 7; Knaus, 1904: 153; Knisley and Schultz, 1997: 90, 96; Laporte, 1834: 28; Larochelle, 1977c: 66-73, 1980b: 40, 42, 1986c: 38-45, 1987a: 31, 32, and 1987b: 55, 57; LaRue, 1994b: 1; LeConte, 1848: 175, 1858: 27, and 1861a: 335; Leng, 1902a: 109, 1902b: 131, 1915: 559, and 1920: 40; Leng and Beutenmüller, 1894a: 43, and 1894b: 88; Leng and Mutchler, 1916: 684, 686, and 1917: 193; Linnaeus, 1788: 1922; Löding, 1910: 131; Mather, 1971: 22; McKown

and Shank, 1975: 37, 38; Miller, 1970: 28, and 1971: 60; Nagano et al., 1982: 343; Nidek, 1978: 39; Nooman, 1986: 83; Olivier, 1791: 725, 734; Ortenburger and Hatch, 1926: 142; Pearson et al., 1997: 38; Richman, 1967: 88; Schaupp, 1884a: 78, (pl. 1, fig. 11); Schuler, 1972: 56, (fig. 8); Sherman, F., 1904: 27; Summers, 1873: 132; Tanner, V.M., 1927: 10, (figs. 7, 8); Thomson, 1857: 30, (pl. III, figs. 9, 10); Townsend, 1884c: 219, and 1885: 67; Tucker, 1910: 230; Valenti, 1986a: 5; Vogler and Pearson, 1996: 324; Wagenaar Hummelinck, 1955: 97, (figs. 11, 14, 16), and 1983: 107, (fig. 47); Werner, K., 1993: 53, (pl. 9, fig. 65); Wickham, 1898b: 197; Wiesner, 1992: 47; Willis, 1970: 7, (fig. 26).

BIOLOGY: Blum et al., 1981: 903; Cartwright, 1935: 69; Cresson, 1861: 8; Evans, M.E.G., 1965: 61; Gaumer, 1973: 14; Graves and Pearson, 1973: 165; Ihring, 1926: 157; Johnson, W.N., 1972: 20; Kennaught, 1963: 284; Kirk, 1969: 7, and 1970: 7; Knisley and Schultz, 1997: 96; Kuster, 1979: 297; Kuster and W.G. Evans, 1980: 326; Larochelle, 1973b: 59, 1974c: 34, 1977b: 56, 1978c: 24, and 1980b: 42; Leng, 1902b: 132, 135; Milliger et al., 1971: 41; Mitchell, 1902: 108; Moore, I., 1937: 3; Pearson et al., 1988: 405, 407, 412; Pratt, 1939: 95; Shelford, 1915b: 250, (figs. 40, 41); Smyth, 1905: 432, and 1908: 187; Spangler, H.G., 1988: 450; Valenti, 1986b: 23; Vogler and Pearson, 1996: 324; Vogler et al., 1997: 6; Vogt, 1949: 2; Wickham, 1893: 392, 1899d: 209, 1900a: 81, and 1901: 20; Wilson, D.A., 1975: 49.

HABITAT: Nocturnal; frequently attracted to lights; during the day they rest under rocks, boards, etc. (Graves and Pearson, 1973: 165; Wickham, 1900a: 81).

carolina floridana Leng and Mutchler, 1916: 684, 688 (*Tetracha*) (as variety of *T. carolina* Linnaeus). FL: Everglade; FL.

TYPE DEPOSITORY: AMNH.

TAXONOMY: Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 4; Dahl, 1941: 170; Dunn, G.A., 1985a: 22; Edwards, J.G., 1949: 72; Horn, W., 1926: 73, and 1930: 79; Lawton and Willis, 1974: 64; Leng, 1920: 40; Werner, K., 1993: 53, (pl. 10, fig. 68); Wiesner, 1992: 48.

virginica (Linnaeus), 1767: 657 (*Cicindela*) (as species). Carolina; WI/ CO/ NE KS IA MO IL IN OH KY/ NY PA NJ DE MD VA/ TX OK/ AR LA MS AL TN GA SC NC FL.

virginata (Linnaeus), 1788: 1922 (*Cicindela*) (as species). VA; probable emendation or lapsus.

melaena Cartwright, 1935: 70 (*Tetracha*) (as variety of *T. virginica* Linnaeus). SC: Clemson College.

TYPE DEPOSITORY: USNM (type no. 50765).

SEX OF TYPE: M.

IMMATURE STAGES: Brain and Knisley, 1982: 99; Downie and Arnett, 1996: 78; Drew and Van Cleave, 1961: 107; Hamilton, C.C., 1925: 58, 60, (figs. 79, 117); Valenti, 1996b: 47.

TAXONOMY: Acciavatti et al., 1992: 53, 73, (fig. 17); Basford et al., 1968: 392; Bates, 1881: 3; Blackwelder, 1939: 7; Blatchley, 1910: 29, (fig. 7); Bousquet and Larochelle, 1993: 54; Boyd, 1978: 198, 201, and 1985: 105; Boyd et al., 1982: 5; Bruner, 1901: 97; Chaudoir, 1860: 337; Choate, 1975: 71, 72; Ciegler, 1997: 179, 184, (fig. 2); Cresson, 1861: 9; Davis, W.T., 1912a: 19, and 1914b: 63; Dejean, 1821: 1, 1825: 10, and 1837: 1; Dillon and Dillon, 1961: 50, (pl. 6, fig. 1); Downie and Arnett, 1996: 78; Drew and Van Cleave, 1961: 103, 107; Drury, 1912: 296; Dunn, G.A., 1985a: 22; Eckhoff, 1939: 203; Edwards, J.G., 1949: 73; Engelhardt, 1910: 130; Fabricius, 1775: 825, 1781: 286, 1787: 187, and 1801: 233; Fattig, 1935: 154; Fleutiaux, 1892: 23; Fox, W.J., 1900: 101; Gemminger and Harold, 1868: 6; Glaser, 1984: 65; Graves and Brzoska, 1991: 4, 5, 9, (fig. 13); Graves and Pearson, 1973: 159, 160, 166, (fig. 3); Harris, E.D., 1911: 60; Harris, E.D. and Leng, 1916: 3; Horn, W., 1903b: 220, 1915: 143-144, 1926: 77, and 1930: 79; Horn, W. et al., 1897: 185; Huber, 1986: 53; Kippenhan, 1994: 22, (fig. 17); Kirk, 1969: 7, and 1970: 7; Knaus, 1915a: 35; Knisley and Schultz, 1997: 90, 97; Knisley et al., 1987a: 281, 282; Larochelle, 1977c: 73, 1986c: 35-42, 1987a: 31, and 1987b: 51-56; Lawton, 1971a: 57; LeConte, 1848: 175; Leng, 1902a: 110, 1902b: 131, 1915: 559, and 1920: 40; Leng and Beutenmüller, 1894a: 43, and 1894b: 88; Mather, 1971: 22; McKown and Shank, 1975: 38; Melsheimer, 1806: 46; Montgomery and Montgomery, 1931: 357; Olivier, 1790: 30, and 1791: 725, 735; Pearson, 1988: 140; Pearson et al., 1997: 38; Robinson and Murray, 1980: 27; Schaupp, 1878b: 5, and 1884a: 78, (pl. 1, fig. 12); Sherman, F., 1904: 27; Summers, 1873: 132; Thomson, 1857: 41; Valenti, 1986a: 5; Werner, K., 1993: 55, (pl. 11, fig. 80); Wickham, 1911: 5; Wiesner, 1992: 52; Willis, 1970: 7, (fig. 26); Wolcott, 1896: 234.

BIOLOGY: Acciavatti et al., 1992: 74; Blatchley, 1910: 29; Blum et al., 1981: 903; Boyd, 1978: 201;

Cresson, 1861: 9; Drury, 1912: 296; Erwin, 1981: 124, 137; Gaumer and Murray, 1971: 9; Graves and Pearson, 1973: 166; Johnson, W.N., 1972: 19, and 1975b: 34; Jones, 1884: 74; King, I.N., 1914: 319; Kirk, 1969: 7, and 1970: 7; Knaus, 1900a: 110; Knisley and Schultz, 1997: 97; Knisley et al., 1987a: 281; Lantz, 1905: 252; Larochelle, 1974c: 35, 1975a: 3, and 1977b: 57; Leng, 1902b: 132, 135; Liebeck, 1890: 158; McCluskey, 1993: 27; Meserve, 1936: 270; Mitchell, 1902: 110; Pearson, 1988: 140; Pearson et al., 1988: 405; Popenoe, 1877: 22; Smyth, 1905: 426; Wickham, 1899d: 209, and 1901: 20.

HABITAT: Dried-up water courses, in sloughs and draws (Knaus, 1900a: 110).

Tribe CICINDELINI Sloane, 1906: 317

Subtribe CICINDELINA Horn, W., 1908 (1915): 8

Genus CICINDELA Linnaeus

Cicindela Linnaeus, 1758: 407 (as genus). Type-species: *Cicindela campestris* Linnaeus (des. by Latreille 1810: 425).

IMMATURE STAGES: Arnett, 1993: 285, (fig. 24.27); Beaulieu, 1900: 137, 138, (fig. 6); Böving and Craighead, 1931: 18; Downie and Arnett, 1996: 78; Gilbert, 1986: 1; Gray, 1832: 262; Hamilton, C.C., 1925: 16; Larochelle, 1987b: 58; Maser, 1971: 79; Pearson, 1988: 128; Putchkov and Arndt, 1992: 419; Rogers, R.V., 1880: 65; Say, 1818: 408; Schaupp, 1883: 11, and 1884a: (pl. V, fig. 124); Valenti, 1996b: 45; Wallis, 1961: 8, 9; Williams, F.X., 1916: 121.

TAXONOMY: Acciavatti and Pearson, 1989: 94; Antoine, 1951: 88; Arnett, 1946: 7, and 1963: 52, 53, (fig. 3.3); Arnold, 1939: 113; Beaulieu, 1900: 137; Blatchley, 1910: 29, (figs. 8, 9); Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 54; Boyd, 1990: 1; Boyd et al., 1982: 6; Caron, 1951: 132, 178; Casey, 1913: 4-16; Cassola and Nidek, 1984: 9; Cazier, 1954: 235; Crampton, 1923: 93, (fig. 37); Dejean, 1825: 17; Dillon and Dillon, 1961: 49; Dokhtouroff, 1883b: 66; Drew and Van Cleave, 1961: 107; Eckhoff, 1939: 202; Edwards, J.G., 1949: 73; Erwin and Sims, 1984: 366; Fleutiaux, 1892: 39; Freitag, 1974: 561, and 1979: 5, 7; Freitag and Barnes, 1989: 248; Freitag et al., 1985: 17; Gray, 1832: 262; Harris, E.D. and Leng, 1916: 3; Hatch, 1953: 37; Horn, G.H., 1876a: 234; Horn, W., 1903b: 215, 1905: 16-24, 1915: 232, and 1926: 127; Knisley and Schultz, 1997: 1-209; Lacordaire, 1843: 105; Larochelle, 1980b: 42; LeConte, 1860: 27; Leffler, 1979a: 242; Leng, 1902a: 111; Leng and Beutenmüller, 1894b: 87; Madge, 1989: 462; Motschulsky, 1850: V, 1; Pearson, 1988: 125; Reichardt, 1977: 374; Rivalier, 1950: 223, 1954: 249, 250, 251, 254, 1957: 321, 1961: 123, 1963: 46, and 1971: 141; Say, 1818: 405; Schilder, 1953b: 539; Shelford, 1906: 5, and 1917: 1; Vidal Sarmiento, 1959: 234; Vogler and Kelly, 1996: 39; Vogler and Pearson, 1996: 322; Vogler and Welsh, 1997: 225; Wallis, 1961: 3, 6, 11, 69; Wiesner, 1992: 109; Willis, 1968: 303.

BIOLOGY: Altaba, 1991: 102; Batra, 1965: 374; Bryson, 1939: 248, (fig. 4); Evans, M.E.G., 1965: 65; Forsythe, 1981: 353; Freitag et al., 1980: 131; Gilbert, 1986: 1; Hlavac, 1971: 57; Knisley and Schultz, 1997: 1-209; Larochelle, 1975a: 1-4, 1980b: 41, and 1987a: 32; Leng, 1902a: 111; Niemelä and Rantz, 1993: 85; Pearson, 1985: 65, and 1988: 128; Pearson and Juliano, 1993: 194; Shelford, 1917: 1; Swan, 1975: 1; Vogler and Kelly, 1996: 39; von Werner, G., 1965: 255; Wallis, 1961: 6; Willis, 1967: 153, and 1972: 29; Wilson, E.O. and Farish, 1973: 292.

KEYS: Arnett, 1946: 5, and 1963: 53; Bertholf, 1983: 7; Blatchley, 1910: 30; Cazier, 1954: 235; Ciegler, 1997: 179; Dejean, 1825: 4; Dillon and Dillon, 1961: 49; Downie and Arnett, 1996: 78; Drew and Van Cleave, 1961: 103; Dunn, G.A., 1984a: 5; Eckhoff, 1939: 202; Freitag and Barnes, 1989: 248; Graves, 1963: 495; Graves and Brzoska, 1991: 5; Graves and Pearson, 1973: 160; Hatch, 1953: 36; Hilchie, 1985: 322; Kippenhan, 1994: 10; Knisley and Schultz, 1997: 1-209; Knisley et al., 1987a: 282; Larochelle, 1976a: 18, 77, 1976b: 73, and 1985: 68; Leng, 1902a: 97, 115; Pearson and Huber, 1995: 5; Putchkov and Arndt, 1994: 419; Rodríquez et al., 1994: 64; Schaupp, 1884a: 73, 78; Sumlin, 1977: 2, and 1985: 220; Wallis, 1961: 10, 13; Werner, G., 1965: 255; Willis, 1968: 303, and 1969b: 8.

Subgenus CICINDELA Linnaeus

Pachydela Rivalier, 1954: 253 (as subgenus of *Cicindela* Linnaeus). Type-species: *Cicindela scutellaris* Say (orig. des.).
TAXONOMY: Acciavatti and Pearson, 1989: 101; Rivalier, 1954: 249; Wiesner, 1992: 109.

arenicola Rumpp, 1967: 130, figs. 1, 2 (as species). ID: Fremont Co., St. Anthony Sand Dunes; ID. Two paratypes (no. 9901) are deposited in CNCI (de Ruette, 1970: 30).
TYPE DEPOSITORY: CASC (type no. 9374).
SEX OF TYPE: M.
IMMATURE STAGES: Bauer, 1991: 226; Rumpp, 1967: 133, (fig. 1); Valenti, 1996b: 47.
TAXONOMY: Bousquet and Larochelle, 1993: 54; Freitag, 1972b: 1279, 1288, (figs. 29-32, 97-104); Larochelle, 1979: 13, and 1987a: 25; Leffler, 1979a: 308; Pearson et al., 1997: 35; Shook, 1984: 159; Shook and Clark, 1988: 38; Werner, K., 1993: 64, (pl. 16, fig. 128); Wiesner, 1992: 122; Willis, 1968: 313.
BIOLOGY: Bauer, 1991: 226; Freitag and Tropea, 1971: 54; Huber, 1989: 12; Shook and Clark, 1988: 38.
HABITAT: Sand dunes (Rumpp, 1967: 131; Willis and Stamatov, 1971: 41).

bellissima bellissima Leng, 1902a: 142, pl. IV (as species). OR: seacoast; WA OR. One cotype is in MCZC.
TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.
IMMATURE STAGES: Leffler, 1979a: 75, (fig. 5E); Valenti, 1996b: 48.
TAXONOMY: Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 7; Dahl, 1941: 188; Engelhardt, 1927: 73; Freitag, 1965: 87, 101, 102, (figs. 6, 10), and 1972b: 1279, 1287, (figs. 21-24, 81-88); Harris, E.D., 1911: 16; Harris, E.D. and Leng, 1916: 6; Hatch, 1938: 234, and 1953: 40, (pl. III, fig. 10); Horn, G.H., 1866: 397; Horn, W., 1903a: 193, 1915: 377, 1926: 272, 1930: 81, and 1938: 49, (pl. 74, fig. 8); Huber, 1986: 54; Larochelle, 1987a: 25, and 1987b: 54; Leffler, 1979a: 287, and 1979b: 466, (fig. 1); Leffler and Pearson, 1976: 40; Leng, 1902a: 116, and 1920: 41; Maser, 1973b: 61; Maser and Beer, 1984: 42, (fig. 6); Pearson et al., 1997: 35; Rivalier, 1954: 253; Schilder, 1953b: 563; Werner, K., 1993: 65, (pl. 16, fig. 133); Wiesner, 1992: 122; Willis, 1968: 313, 316, (fig. 24).
BIOLOGY: Engelhardt, 1927: 75; Maser, 1973b: 61; Rumpp, 1961: 184.
HABITAT: Sand dunes and coastal areas (Maser, 1973b: 61; Willis and Stamatov, 1971: 42).

bellissima frechini Leffler, 1979b: 465, fig. 2 (as subspecies of *C. bellissima* Leng). WA: Clallam Co., Mukkah Bay; WA.
TYPE DEPOSITORY: AMNH.
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 7; Larochelle, 1989a: 21; Leffler, 1979a: 302; Werner, K., 1993: 65, (pl. 16, fig. 134); Wiesner, 1992: 122.
HABITAT: Coastal sand dunes and plains often devoid of vegetation (Leffler, 1979b: 469).

columbica Hatch, 1938: 234 (as subspecies of *C. bellissima* Leng). WA: Perry; WA OR ID.
TAXONOMY: Beer, 1971: 32; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 7; Freitag, 1965: 101, 102, (figs. 7, 10), and 1972b: 1279, 1288, (figs. 25-28, 89-96); Hatch, 1953: 39; Larochelle, 1987a: 25; Leffler, 1979a: 303; Leffler and Pearson, 1976: 41; Maser and Beer, 1984: 42, (fig. 7); Pearson et al., 1997: 35; Schilder, 1953b: 563; Shook, 1984: 159, and 1990: 46; Werner, K., 1993: 65, (pl. 16, fig. 132); Wiesner, 1992: 122; Willis, 1968: 311.
BIOLOGY: Beer, 1971: 32; Huber, 1989: 12; Maser and Beer, 1984: 51; Shook, 1981: 359; Willis and Stamatov, 1971: 42.
HABITAT: Sandbars and dunes along banks of Columbia River (Beer, 1971: 32).

decemnotata Say, 1817: 19 (as species). Missouri, above confluence of River Platte; AK YT/ BC WA ID/ AB SK MT ND/ WY UT CO/ ?KS.
albertina Casey, 1913: 24 (as subspecies of *C. decemnotata* Say). AB: Lethbridge.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

lantzi Harris, E.D., 1913a: 68, fig. 2 (as species). CO: Jefferson, at the side of a gravel hill.

TYPE DEPOSITORY: MCZC (type no. 23552).

IMMATURE STAGES: Leffler, 1979a: 80; Valenti, 1996b: 48.

TAXONOMY: Beaulieu, 1900: 153; Blackwelder, 1939: 7; Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 8; Bruner, 1901: 98; Cresson, 1861: 12; Dunn, G.W., 1891: 153; Evans, J.E., 1903: 240; Ferris, 1969: 11; Fletcher, J. and Gibson, 1908: 108; Fleutiaux, 1892: 98; Gemminger and Harold, 1868: 13; Gibson, 1914: 106; Harrington, 1890: 138; Harris, E.D., 1911: 8; Harris, E.D. and Leng, 1916: 5; Hatch, 1938: 233, (fig. 6), and 1953: 36, (pl. III, fig. 6); Hilchie, 1985: 323, 329, (fig. 28); Hooper, 1969: 2; Horn, W., 1903a: 182, 192, 1915: 374, 1926: 267, 1930: 80, and 1938: 48, (pl. 72, figs. 27, 28); Huber, 1986: 55; Kippenhan, 1990a: 310, and 1994: 25, 48, (fig. 33); Knaus, 1907: 233; Larochelle, 1986c: 39, 47, 1987a: 24, 30, and 1989b: 44; Larson, P.R., 1981: 52; LeConte, 1848: 184, 1860: 61, and 1875: 158; Leffler, 1979a: 337; Leffler and Pearson, 1976: 49; Leng, 1902a: 128, 134, (pl. III), 1918: 140, and 1920: 40; Nicolay, 1934: 129; Nicolay and Weiss, 1932: 353; Pearson et al., 1997: 35; Rivalier, 1954: 253; Say, 1818: 423; Schaupp, 1884a: 80, 90, (pl. 2, fig. 41; pl. 5, fig. 145); Schilder, 1953b: 562; Shook, 1984: 159; Varas Arangua, 1929a: 244; Wallis, 1961: 15, 40, 69, (pl. 2, fig. 38); Werner, K., 1993: 68, (pl. 19, fig. 155); Wickham, 1894: 153; Wiesner, 1992: 130; Willis, 1968: 314, (fig. 30), and 1970: 8, (fig. 27).

BIOLOGY: Acorn, 1991: 25; Hilchie, 1985: 329; Lawton, 1972b: 35, 39; Lawton and Willis, 1974: 48, 49; Vaurie, 1950b: 145; Wickham, 1899d: 216; Willis and Stamatov, 1971: 42.

HABITAT: Dry gravelly, clay soil (Wallis, 1961: 40).

denikei Brown, 1934: 22 (as subspecies of *C. sexguttata* Fabricius). ON: Ingolf; MB/ MN ON. An allotype and six paratypes are deposited in CNCI.

TYPE DEPOSITORY: CNCI (type no. 3529).

SEX OF TYPE: M.

IMMATURE STAGES: Kaulbars and Freitag, 1993a: 45; Valenti, 1996b: 49.

TAXONOMY: Blackwelder, 1939: 8; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 8; Downie and Arnett, 1996: 80, 82; Graves, 1965: 66; Kaulbars, 1982: 1; Kaulbars and Freitag 1993b: 267, and 1993c: 53; Larochelle, 1987a: 22, and 1989b: 45, 47; Pearson et al., 1997: 35; Schilder, 1953b: 562; Wallis, 1961: 30, 69, (pl. 4, fig. 94); Werner, K., 1993: 68, (pl. 20, fig. 157); Wiesner, 1992: 131; Willis, 1968: 311.

HABITAT: Open places beside stands of mixed coniferous forest, sand and gravel roads, bare rock, under patches of moss (Freitag and Tropea, 1971: 56; Wallis, 1961: 32); Canadian Shield, sandy, silty till (Kaulbars and Freitag, 1993b: 307).

denverensis Casey, 1897: 297 (as species). CO: Denver; MT ND SD/ WY CO/ NE KS/ NM TX OK/ LA.

TYPE DEPOSITORY: USNM (type no. 45939).

ludoviciana Leng, 1902a: 132 (as variation of *C. purpurea* Olivier). Natchitoches Parish, Vowell's Mill. Two cotypes are deposited in MCZC.

TYPE DEPOSITORY: AMNH (lectotype).

SEX OF TYPE: M.

conquisita Casey, 1914b: 357 (as subspecies of *C. denverensis* Casey). NE: Sioux Co.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

oreada Casey, 1914b: 358 (as subspecies of *C. denverensis* Casey). NE: Benkelman.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

plattensis Smyth, 1933: 202 (as species). Valley of the south Platte.

TAXONOMY: Acciavatti et al., 1979: 30; Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 8; Drew and Van Cleave, 1961: 116, Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 78; Harris, E.D. and Leng, 1916: 4, 5; Horn, W., 1915: 373, 444, 1926: 266, 1930: 80, and 1938: 48, (pl. 72, figs. 18, 19); Huber, 1986: 55; Kippenhan, 1990a: 310, and 1994: 25, 45, (fig. 26); Kirk and Balsbaugh, 1975: 12; Lantz, 1905: 256; Larochelle, 1986c: 42; Larson, P.R., 1981: 52; Leng, 1902a: 131, 132, 1902b: 131, and 1920: 40; Nicolay, 1934: 129; Nicolay and Weiss, 1932: 351; Pearson et al., 1997: 36; Rivalier, 1954: 253; Schilder, 1953b: 562; Schincariol, 1988: 1; Schincariol and Freitag, 1991: 1327, 1347; Shelford, 1917: 1; Smyth, 1908: 183, 1933: 197, and 1935: 14; Snow, 1903: 192; Varas Arangua, 1929a: 240; Wallis, 1961: 45; Ward, 1971: 70, (fig. 2); Werner, K., 1993: 67, (pl. 19, fig. 152); Wiesner, 1992: 130; Willis, 1968: 316.

BIOLOGY: Kippenhan and Carter, 1993: 49; Lawton, 1972b: 35, 38; Leng, 1902b: 133; Meserve, 1936: 271; Schincariol and Freitag, 1991: 1327; Smyth, 1905: 429; Wickham, 1899d: 216; Willis, 1970: 3, (fig. 5).

HABITAT: Clay banks and gullies in short grass prairies (Willis, 1970: 3).

depressula depressula Casey, 1897: 297 (as species). CA: Placer Co.; AK/ BC WA OR ID/ MT/ CA NV.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Leffler, 1979a: 73; Valenti, 1996b: 48.

TAXONOMY: Blaisdell, 1906: 106; Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 7; Casey, 1913: 29; Freitag, 1965: 87, 101, 102, 138, (figs. 3, 10); Freitag and Pearson, 1973: 29; Harris, E.D., 1911: 14; Harris, E.D. and Leng, 1916: 7; Hatch, 1938: 235, and 1953: 42, (pl. III, fig. 17); Horn, W., 1902a: 234, 1903a: 190, 192, 1915: 378, 1926: 274, 1930: 82, and 1938: 49, (pl. 74, figs. 23-25); Larochelle, 1977c: 65; Leffler, 1979a: 279; Leffler and Pearson, 1976: 39; Leng, 1902a: 116, 147, 150, and 1920: 41; Maser and Beer, 1984: 42, (fig. 10); Pearson et al., 1997: 36; Rivalier, 1954: 253; Schilder, 1953b: 562; Shook, 1984: 159; Valenti, 1986a: 1; Wallis, 1961: 24, 69, (pl. 3, fig. 75); Werner, K., 1993: 62, (pl. 14, figs. 110, 111); Wiesner, 1992: 120; Willis, 1968: 311, 316, (fig. 18).

REDESCRIPTION: Leng, 1902a: 150, (pl. III).

BIOLOGY: Pearson et al., 1988: 412.

HABITAT: Wet paths and roadcuts in AK and BC and at high elevations of the Cascade Range and northern Sierra Nevada (Freitag and Pearson, 1973: 29; Willis and Stamatov, 1971: 43).

depressula eureka Fall, 1901: 307 (as species). CA: Humbolt Co.; WA OR/ CA.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 7; Casey, 1913: 30; Cazier, 1939a: 28; Freitag, 1965: 138, and 1972b: 1279, 1284, (figs. 13-16, 65-72); Freitag and Pearson, 1973: 29; Harris, E.D., 1911: 16; Harris, E.D. and Leng, 1916: 7; Hatch, 1953: 41; Horn, W., 1903a: 180, 1915: 377, 1926: 274, 1930: 82, and 1938: 49, (pl. 74, fig. 18); Larochelle, 1987a: 25; Leffler, 1979a: 282; Leffler and Pearson, 1976: 39; Leng, 1902a: 146, 149, (pl. III), and 1920: 41; Maser and Beer, 1984: 42, (fig. 10); Rivalier, 1954: 253; Schilder, 1953b: 562; Werner, K., 1993: 63, (pl. 14, fig. 112); Wiesner, 1992: 120; Willis, 1968: 311, 316, (fig. 18).

REDESCRIPTION: Leng, 1902a: 149, (pl. III).

BIOLOGY: Gaumer, 1970b: 14.

HABITAT: Riverbanks near Pacific coast of northern CA, OR and WA (Freitag, 1965: 143).

duodecimguttata Dejean, 1825: 73 (as species). North America; NT/ AB SK MB MT ND SD/MN WI MI ON PQ/ NB PE NS NF/ WY CO/ NE KS IA MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ ME NH VT MA RI CT/ TX OK/ AR LA MS AL TN GA SC NC.

TYPE DEPOSITORY: MNHP.

proteus Kirby, 1837: 9 (as species). Canada; United States.

bucolica Casey, 1913: 28 (as species). MB: Aweme.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

hudsonica Casey, 1916: 29 (as species). Hudson Bay Territory.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

edmontonensis Carr, 1920: 218 (as variety of *C. repanda* Dejean). AB: Edmonton.

TYPE DEPOSITORY: CNCI (type no. 407).

SEX OF TYPE: F.

IMMATURE STAGES: Drew and Van Cleave, 1961: 105, 109; Hamilton, C.C., 1925: 19, 39, (figs. 68, 105, 135); Palmer, 1978a: 49; Schaupp, 1879a: 1, and 1879b: 23; Shelford, 1908: 166; Valenti, 1996b: 46; Wilson, D.A., 1974: 79.

TAXONOMY: Acciavatti et al., 1992: 54, 56, (fig. 2); Andrews, W.V., 1872: 140, and 1917: 137; Angell, 1911: 264; Austin, 1874: 266; Beaulieu, 1900: 140; Bethune, 1870: 77; Blatchley, 1910: 31, 34, (fig. 21); Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 55; Boyd, 1973: 4, and 1978: 199, 204, (fig. 5); Boyd et al., 1982: 6; Brown, 1930a: 231, and 1930b: 146; Bruner, 1901: 98; Caron, 1951: 180, 183; Carr, 1923: 196; Casey, 1924: 16; Chagnon and Robert, 1962: 80, (fig. 5E), 374; Ciegler, 1997: 184, 186, (fig. 6); Cockerell, 1893: 44; Cresson, 1861: 12; Criddle,

1921: 72; Davis, C.A., 1903: 272; Davis, W.T., 1915a: 71; Dawson and W. Horn, 1928: 8; Dejean, 1831: 211, and 1837: 3; Dillon and Dillon, 1961: 51, 54, (pl. V, fig. 3); Downie and Arnett, 1996: 80, 81, (fig. 3.6); Drew and Van Cleave, 1961: 104, 109, (fig. 12); Dunn, G.A., 1981a: 1, 2, (fig. 3), and 1986b: 28; Dunn, G.W., 1891: 154; Eckhoff, 1939: 207, 213; Edwards, J.G., 1949: 73; Emmons, 1854: 36; Engelhardt, 1911: 267; Evans, J.D., 1895: 142, and 1899: 320; Fall, 1894: 99; Fattig, 1935: 154; Fletcher, J., 1905: 56; Fletcher, J. and Gibson, 1908: 108, and 1909: 99; Fleutiaux, 1892: 90; Foster and Knowles, 1990: 838; Freitag, 1965: 87, 101-102, 162, (figs. 1, 10, 11, 13, 15), 1972a: 22, and 1972b: 1279, 1281, (figs. 5-9, 49-56); Gaumer and Murray, 1971: 9; Gibson, 1914: 106; Glaser, 1984: 66, 70; Gould, 1834: 51, (pl. 3, fig. 3); Goulet, 1983: 17, 22, (fig. 13); Graves, 1962: 1231, 1963: 496, 498, (fig. 5), and 1965: 65; Graves and Brzoska, 1991: 4, 6, 11, (fig. 15); Graves and Pearson, 1973: 159, 164, 168, (fig. 5); Green, 1918: 120; Hamilton, J., 1893: 272, 324; Harrington, 1882a: 8, 1882b: 28, and 1890: 138; Harris, E.D., 1901b: 27, 1902: 217, 1911: 11, and 1918b: 237; Harris, E.D. and Leng, 1916: 5; Harris, T.W., 1852: 1, (fig. C); Harvey and Knight, 1897: 79; Hatch, 1924: 547, and 1953: 38; Henshaw, 1875: 17; Hicks, 1947b: 148; Hilchie, 1985: 324, 325, (figs. 8, 18); Hooper, 1969: 1; Horn, G.H., 1866: 397, 1876c: 127, and 1892: 27; Horn, W., 1902a: 234, 1915: 33, 374, (fig. 95), 1926: 267, 268, 1928: 10, 1930: 80, and 1938: 48, (pl. 73, figs. 2-5); Houghton, 1908: 400; Johnson, H.L., 1915: 308; Jules, 1937: 2, 4, (fig. 2); Kippenhan, 1990a: 309, and 1994: 24, 30, (fig. 21); Kirk, 1970: 7; Kirk and Balsbaugh, 1975: 12; Knaus, 1900a: 113; Knisley and Schultz, 1997: 93, 105, (photo. 8); Knisley et al., 1987a: 281, 283, (figs. 11D, 15); Kritsky et al., 1996: 29; Landry, L.P., 1979a: 44; Lantz, 1905: 258; Larochelle, 1972b: 51, 1974g: 87, 1975b: 25, 74, 1976a: 77, (figs. 385, 387), 1976b: 73, 76, (fig. 8), 1977c: 66-73, 1980b: 40-42, 1986c: 36-48, 1986d: 59, 1987a: 21-31, 1987b: 55-57, and 1989b: 41-46; Larson, P.R., 1981: 52; LeConte, 1848: 181, and 1860: 42, (fig. 24); Leng, 1902a: 146, 148, (pl. III), 1910a: 73, 1912: 4, 6, 12, 1917b: 243, 1918: 140, and 1920: 40; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 93, (fig. 17); Leng and Mutchler, 1927: 7; Liard, 1979a: 16; Lindroth, 1953: 169, 1954b: 365, and 1955: 16; Mather, 1971: 21; Montgomery and Montgomery, 1931: 358; Motschulsky, 1850: 3; Nicolay, 1930: 218; Notman, 1919: 92; Papp, H., 1952: 515; Pearson et al., 1997: 36; Pettit, 1869: 106; Popenoe, 1877: 22; Provancher, 1870: 22; Richard, 1979a: 4, and 1979b: 5; Rivalier, 1954: 252; Rogers, R.V., 1880: 64, and 1881: 24; Schaupp, 1878f: 56, and 1884a: 95, (pl. 3, fig. 63; pl. 5, fig. 135); Schilder, 1953b: 560; Sherman, F., 1904: 30; Shoemaker and W.T. Davis, 1915: 157; Smith, J.B., 1909: 197; Snow, 1877b: 16; Stevenson, 1904a: 74; Summers, 1873: 132; Tanner, V.M., 1951: 49; Valenti, 1986a: 2; Wallis, 1961: 16, 18, 20, 21, 69, (pl. 2, figs. 40-44); Werner, K., 1993: 62, (pl. 13, fig. 105); Wickham, 1894: 152, and 1911: 5; Wiesner, 1992: 120; Willis, 1967: 145, 237, 1968: 313, (fig. 26), and 1970: 3, (fig. 6); Wilson, D.A., 1970: 20; Wilson, D.A. and Brower, 1983: 8, 28, (figs. 4, 5); Wolcott, 1895: 309.

REDESCRIPTION: Freitag, 1965: 102.

BIOLOGY: Acciavatti et al., 1992: 50; Acorn, 1992: 217, and 1994: 9; Blanchard, 1921: 397; Blatchley, 1910: 34; Boyd, 1978: 204; Cartwright, 1935: 71; Criddle, 1907: 110, and 1915: 27; Cutler, 1969a: 5; Drew and Van Cleave, 1961: 109; Dunn, G.A., 1978: 2, and 1981a: 2; Freitag, 1972a: 22; Freitag and Tropea, 1969: 14, 15, and 1971: 55; Glaser, 1984: 70; Graves 1963: 498, and 1965: 65; Graves and Brzoska, 1991: 11; Graves and Pearson, 1973: 168; Hilchie, 1985: 325; Jones, 1884: 75; Knisley and Schultz, 1997: 93, 105, (photo. 8); Knisley et al., 1987a: 281; Kritsky and Simon, 1995: 146; Landry, J.F., 1978: 14; Larochelle, 1971c: 78, 1972a: 8, 1973b: 58, 1973c: 6, 1974c: 24, 1974h: 100, 1975a: 2, 1977b: 51, 1978c: 24, 1980a: 35, and 1989a: 20; Lavigne, 1972: 3; Leng, 1902d: 239; Liebeck, 1890: 159; Lindroth, 1963: 12, 24, 34; Martin, J.L., 1965: 87; Meserve, 1936: 271; Palmer, 1978a: 49; Pearson et al., 1988: 412; Schaupp, 1878a: 2; Shelford, 1911: 584; Smyth, 1905: 426, and 1908: 180; Vaurie, 1950b: 145; Wickham, 1899d: 219; Wilson, D.A., 1978: 15; Wilson, D.A. and Brower, 1983: 8.

HABITAT: Edges of lakes, ponds, rivers, streams, and sloughs; wherever soil is dark and consists of mixtures of sand and clay, or clay and mud (Cartwright, 1935: 71; Freitag, 1965: 103).

formosa formosa Say, 1817: 19 (as species). Missouri above confluence of Platte River; AB SK MT ND SD/ WY CO/ NE KS MO/ NM TX OK.

luxuriosa Casey, 1913: 24 (as subspecies of *C. formosa* Say). CO: near Denver.

TYPE DEPOSITORY: USNM (type no. 45971).

SEX OF TYPE: M.

fletcheri Criddle, 1925b: 127 (as race of *C. formosa* Say). MT: Marias River, Sunshine Road. The allotype is deposited in CNCI (de Ruette, 1970: 30); and one paratype (no. 280) in SEMC.

TYPE DEPOSITORY: CNCI (type no. 1418).
SEX OF TYPE: M.

IMMATURE STAGES: Drew and Van Cleave, 1961: 105, 109; Gaumer, 1977: 182, 190, (fig. 45D); Hamilton, C.C., 1925: 19, 46, (figs. 74, 111, 141); Schultz, 1989: 470; Valenti, 1996b: 46, 48.

TAXONOMY: Acciavatti et al., 1979: 30; Beaulieu, 1900: 153; Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 7; Bruner, 1901: 98; Byers and Karren, 1968: 3; Cresson, 1861: 12; Döbler, 1973: 378; Downie and Arnett, 1996: 80, 81, (fig. 3.8); Drew and Van Cleave, 1961: 105, 109, (fig. 7); Eckhoff, 1939: 206, 224; Fall, 1895: 176; Fleutiaux, 1892: 94; Gaumer, 1977: 182, (fig. 45); Gaumer and Murray, 1971: 9; Gemminger and Harold, 1868: 16; Harris, E.D., 1909: 47, and 1911: 1; Harris, E.D. and Leng, 1916: 4; Hatch, 1953: 40; Hilchie, 1985: 323, 328, (fig. 21); Horn, W., 1903a: 185, 1915: 371, 1926: 262, 1930: 79, and 1938: 48, (pl. 72, fig. 1); Kippenhan, 1990a: 310, and 1994: 24, 37, (fig. 27); Kirk and Balsbaugh, 1975: 12; Knaus, 1893: 294, 1894: 126, 1895: 284, 1897: 197, 1899: 37, 38, 1900a: 112, 1915a: 35, 1915b: 84, 1916: 79, 1924b: 171, and 1926: 263; Lantz, 1905: 257; Larochelle, 1977c: 69-70, 1986c: 39, 42, 1987a: 24-33, and 1987b: 55, 56; Larson, P.R., 1981: 52; LeConte, 1848: 180, and 1860: 39, (fig. 18); Leng, 1902a: 115, 135, 136, and 1920: 40; Leng and Mutchler, 1933: 9; Meserve, 1935: 162; Pearson et al., 1997: 36; Popenoe, 1877: 22; Rivalier, 1954: 252, 253, (fig. 1a); Robinson, 1948: 27; Rumpp, 1986: 142, 147; Say, 1818: 422; Schaupp, 1884a: 80, 91, (pl. 2, fig. 48); Schilder, 1953b: 563; Snow, 1878b: 63, and 1903: 192; Tanner, V.M., 1951: 49; Valenti, 1986a: 2; Varas Arangua, 1929a: 233; Wallis, 1961: 15, 36, 69, (pl. 1, fig. 3); Werner, K., 1993: 65, (pl. 16, fig. 135); Wickham, 1894: 153; Wiesner, 1992: 128; Willis, 1968: 314, (fig. 24), and 1970: 3, (fig. 7).

REDESCRIPTION: Leng, 1902a: 136, (pl. III).

BIOLOGY: Acorn, 1988: 32, 1991: 17, and 1992: 217-233, (fig. 115); Chapman et al., 1926: 424; Drew and Van Cleave, 1961: 109; Graves and Pearson, 1973: 169; Hilchie, 1985: 328; Johnson, W.N., 1975b: 34; Knisley, 1984: 93; Kritsky and Simon, 1995: 146; Larochelle, 1974c: 25; Lawton, 1971b: 61, 62, 66, and 1972b: 35, 37; Lawton and Willis, 1974: 47, 48; Leng, 1902a: 136; Meserve, 1936: 270; Pearson and Juliano, 1991: 224; Pearson and Mury Meyer, 1979: 564; Pearson et al., 1988: 412; Riley, 1877: 98; Schultz, 1982: 41, and 1986: 143, (fig. 1); Smyth, 1905: 425-428, and 1908: 180; Vaurie, 1950b: 145; Wickham, 1899d: 216; Willis and Stamatov, 1971: 43; Wilson, D.A., 1975: 45.

HABITAT: Dry sandy spots among short grass and weeds, not in the immediate vicinity of water; also sandy roads (Wickham, 1899d: 216).

formosa generosa Dejean, 1831: 231 (as species). North America; MB ND/ MN WI MI ON PQ/ IA MO IL IN OH KY/ NY PA NJ DE MD WV VA/ ME NH VT MA RI CT/ AR LA MS AL TN.

TYPE DEPOSITORY: MNHP.

manitoba Leng, 1902a: 137, pl. III (as variety; subspecies of *C. formosa* Say). MB: Aweme. One cotype is in MCZC.

TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.

IMMATURE STAGES: Criddle, 1910: 10; Davis, W.T., 1937: 84; Dow, 1916b: 70; Fox, W.J., 1898: 207; Gaumer, 1977: 182, 205, (fig. 46D); Hamilton, C.C., 1925: 19, 47, (figs. 49-51, 88-90, 142); Larochelle, 1977c: 67; Shelford, 1907: 12, and 1908: 165; Valenti, 1996b: 46, 48.

TAXONOMY: Acciavatti et al., 1992: 54, 59, (fig. 4); Angell, 1912: 212, and 1937: 37; Arnett, 1993: 286; Beaulieu, 1900: 140; Blatchley, 1910: 31, 33, (fig. 14); Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 55; Boyd, 1973: 4, and 1978: 199, 206, (fig. 7); Boyd et al., 1982: 7; Bruner, 1901: 98; Caron, 1951: 180, 183; Chagnon and Robert, 1962: 375; Cresson, 1861: 13; Dahl, 1941: 170; Davis, C.A., 1903: 272; Davis, W.T., 1895: 140, 1909: 96, 1911c: 203, 1913: 42, 1915a: 71, 1915d: 156, 1918b: 125, and 1918e: 39; Dawson and W. Horn, 1928: 8; Dejean, 1837: 3; Dillon and Dillon, 1961: 51, (pl. V, fig. 2); Downie and Arnett, 1996: 80, 81; Dunn, G.A., 1981a: 2, (fig. 4), and 1986b: 28; Easton, 1909: 36; Eckhoff, 1939: 206, 208; Edwards, J.G., 1949: 73; Emmons, 1854: 34; Evans, J.E., 1903: 240; Fall, 1895: 177; Fletcher, J., 1903: 87; Fleutiaux, 1892: 94; Frost, C.A., 1916: 381, and 1946: 30; Gaumer, 1977: 196, (fig. 46); Gemminger and Harold, 1868: 16; Glaser, 1984: 66, 70; Gould, 1834: 42, (pl. 2, fig. 2); Goulet, 1983: 17, 22, (fig. 6); Graves, 1963: 496, 499, (fig. 12), and 1965: 66; Graves and Brzoska, 1991: 4, 6, 13, (fig. 17); Graves and Pearson, 1973: 159, 164, 169, (fig. 7a); Hamilton, J., 1885b: 202; Harris, E.D., 1905a: 100, 1909: 47, 1911: 2, 1912c: 212, and 1918b: 237;

Harris, E.D. and Leng, 1916: 4; Harris, T.W., 1852: 1, (fig. J); Hoffman, 1991: 176; Hood, L.E., 1903: 115; Horn, G.H., 1892: 26, (figs. 2, 3); Horn, W., 1903a: 194, 1915: 371, 1926: 262, 1928: 9, 1930: 79, and 1938: 48, (pl. 72, figs. 3-6); Johnson, H.L., 1915: 308; Jules, 1937: 2, 4, (fig. 11); King, B.L., 1988: 43; Knisley and Schultz, 1997: 93, 107, (photo. 9); Knisley et al., 1987a: 281, 283, (fig. 16); Landry, J.F., 1978: 14; Landry, L.P., 1979c: 46; Larochelle, 1972b: 55, 1974g: 87, 1975b: 25, 75, 1976a: 78, (fig. 391), 1976b: 74, 76, (fig. 14), 1977c: 69-71, 1979: 13, 1980b: 41, 1986c: 33-48, 1986d: 59, 1987a: 23-33, 1987b: 51-57, and 1989b: 43-47; Larson, P.R., 1981: 52; Lawton, 1974b: 71, 72, (fig. 1); LeConte, 1848: 179, 1860: 39, (fig. 17), and 1866: 363; Leng, 1902a: 136, 137, 1912a: 5, 14, and 1920: 40; Leng and Beutenmüller, 1893: 92, and 1894b: 89, 92, (fig. 13); Lesieski, 1923a: 56, and 1923b: 118; Liard, 1979a: 16; Mather, 1971: 22; Meserve, 1935: 162; Papp, H., 1952: 512; Provancher, 1870: 222; Rivalier, 1954: 253; Rogers, R.V., 1880: 64, (fig. 14), and 1881: 24; Schaupp, 1884a: 80, 91, (pl. 2. figs. 49, 50); Schilder, 1953a: 315, and 1953b: 563; Shelford, 1911: 584; Shoemaker and W.T. Davis, 1915: 157; Skinner, 1909: 185; Smith, J.B., 1909: 197; Summers, 1873: 132; Valenti, 1986a: 2; Varas Arangua, 1929a: 233, 234; Wallis 1961: 36, 69, (pl. 1, figs. 4-10); Werner, K., 1993: 65, (pl. 16, fig. 136); Wickham, 1894: 151, (fig. 14), and 1911: 5; Wiesner, 1992: 128; Williams, J., 1879: 39; Wilson, D.A. and Brower, 1983: 10, 29, (fig. 7).

REDESCRIPTION: Leng, 1902a: 136, (pl. II, III).

BIOLOGY: Acciavatti et al., 1992: 59; Acorn, 1992: 217, 226, (fig. 11.5); Blatchley, 1910: 33; Boyd, 1978: 206; Criddle, 1907: 108, and 1915: 27; Cutler, 1969b: 14; Dunn, G.A., 1981a: 2; Fox, H., 1910: 82; Freitag and Tropea, 1969: 22, 23, and 1971: 55, 56; Goldsmith, 1916: 447, 454; Graves, 1963: 499, and 1965: 66; Graves and Brzoska, 1991: 13; Graves and Pearson, 1973: 169; King, J.N., 1914: 319; Knisley, 1979: 211; Knisley and Schultz, 1997: 93, 107, (photo. 9); Knisley et al., 1987a: 281; Landry, J.F., 1978: 14; Larochelle, 1974c: 22, 25, 1974h: 100, and 1978c: 23; Lavigne, 1972: 3; Leng, 1902d: 238; Liebeck, 1890: 159; May et al., 1986: 171; Meserve, 1936: 270; Nelson and LaBonte, 1989: 51; Pearson et al., 1988: 412; Ward and Bowling, 1980: 29, 31; Wickham, 1899d: 217; Will et al., 1995: 62; Willis and Stamatov, 1971: 44, 46; Wilson, D.A. and Brower, 1983: 10.

HABITAT: Sandy soil with sparse vegetation on the south and west slopes of a hill (Montgomery and Montgomery, 1931: 357); dry, sparsely vegetated sandy areas, on bare spots, and along sandy paths and roads (Boyd, 1978: 207).

formosa gibsoni Brown, 1940: 182, fig. 1 (as subspecies of *C. formosa* Say). SK: Great Sand Hills, W. of Swift Current; SK ND/ CO. The allotype is in CNCI.

TYPE DEPOSITORY: CNCI (type no. 4885).

SEX OF TYPE: M.

IMMATURE STAGES: Gaumer, 1977: 182, 217, (fig. 48D); Valenti, 1996b: 48.

TAXONOMY: Blackwelder and Blackwelder, 1948: 1; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 7; Dahl, 1942: 132; Gaumer, 1977: 213, (fig. 48); Hooper, 1969: 2; Kippenhan, 1990a: 310, and 1994: 37, (fig. 28); Larochelle, 1986a: 13, and 1987a: 22; Larson, P.R., 1981: 52; Schilder, 1953b: 563; Wallis, 1961: 38, (pl. 1, figs. 11-14, 16); Werner, K., 1993: 65, (pl. 16, fig. 136); Wiesner, 1992: 128.

BIOLOGY: Acorn, 1988: 32, 1991: 22, and 1992: 217, 226, (fig. 11.5); Kippenhan, 1990b: 56-58, (figs. 3 -5); Larochelle, 1974c: 25; Lawton and Willis, 1974: 50; Schultz and Hadley, 1987b: 737; Willis and Stamatov, 1971: 43.

HABITAT: Sand dunes and road cuts in sandy areas where vegetation is sparse (Willis and Stamatov 1971: 43).

formosa pigmentosignata Horn, W., 1930: 76 (as subspecies of *C. formosa* Say). TX: Kaufman Co., Rosser; TX/ AR LA. Syntypes are in USNM and IPZE.

TYPE DEPOSITORY: USNM (lectotype no. 41843).

SEX OF TYPE: F.

IMMATURE STAGES: Gaumer, 1977: 182, 211, (fig. 47D); Valenti, 1996b: 48.

TAXONOMY: Acorn, 1992: 227, (fig. 11.5); Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 7; Döbler, 1973: 378; Erwin and House, 1978: 236; Gaumer, 1977: 206, (fig. 47); Gaumer and Murray, 1971: 9; Graves and Pearson, 1973: 159, 164, 169, (fig. 7b); Horn, W., 1938: 48, (pl. 72, fig. 2); Leng and Mutchler, 1933: 9; Rivalier, 1954: 253; Schilder, 1953b: 563; Ward, 1971: 71, (figs. 11, 12); Werner, K., 1993: 65, (pl. 17, fig. 139); Wiesner, 1992: 128.

BIOLOGY: Acorn, 1988: 32; Graves and Pearson, 1973: 169; Lawton, 1971b: 61, 65; Pearson et al., 1988: 412; Schultz, 1986: 145, and 1989: 468; Schultz and Hadley, 1987b: 737; Schultz and

Rankin, 1985a: 87.
HABITAT: Sandy unimproved service roads through pine woods (Ward, 1971: 70).

formosa rutilovirescens Rumpp, 1986: 142, figs. 1(2), 5 (as subspecies of *C. formosa* Say). NM: Chaves Co., Mescalero Sands; NM TX.
TYPE DEPOSITORY: CASC (type no. 12984).
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 55; Werner, K., 1993: 66, (pl. 17, fig. 140); Wiesner, 1992: 128.
HABITAT: Light colored sand, low hills, 2-3 m high, covered with a short scrub oak; a few bare dunes rise up to 8 m (Rumpp, 1986: 142).

fulgida fulgida Say, 1823: 141 (as species). Missouri Territory; AB SK MT ND SD/ MN/ WY UT CO/ NE KS/ AZ NM TX OK. Near mountains on Nebraska (Platte) and Arkansas Rivers.
subnitens Calder, 1922a: 62 (as variety of *C. fulgida* Say). NE: Lincoln.
TYPE DEPOSITORY: Schoemaker Collection?

IMMATURE STAGES: Criddle, 1910: 14; Valenti, 1996b: 47; Willis, 1967: 165, (figs. 41-46).
TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1983: 8, 9, (fig. 4); Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 55; Boyd et al., 1982: 9; Bruner, 1901: 98; Cazier, 1937c: 159, 160, (pl. 36, fig. 4); Cresson, 1861: 13; Dahl, 1940: 80; Dawson and W. Horn, 1928: 8; Drew and Van Cleave, 1961: 104, 109, (fig. 13); Eckhoff, 1939: 206, 207, 225; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 95; Gemminger and Harold, 1868: 16; Harris, E.D., 1911: 23; Harris, E.D. and Leng, 1916: 7; Hilchie, 1985: 324, 330, (figs. 7, 20); Horn, W., 1903a: 183, 1915: 378, 1926: 275, 1928: 12, 1930: 82, and 1938: 49, (pl. 75, figs. 5-6); Kippenhan, 1990a: 311, and 1994: 24, 51, (fig. 37); Kirk and Balsbaugh, 1975: 13; Knaus, 1900a: 113, 1902: 148, 1904: 153, and 1924b: 171; Knudsen, 1985: 177; Lantz, 1905: 257; Larochelle, 1977c: 69-70, 1986c: 42, and 1987a: 22, 29; Larson, P.R., 1981: 52; LeConte, 1848: 179, and 1860: 40, (fig. 21); Leng, 1902a: 116, 139, and 1920: 41; Leng and Mutchler, 1927: 7; Papp, H., 1952: 519; Pearson et al., 1997: 36; Popenoe, 1877: 22; Rivalier, 1954: 253; Schaupp, 1884a: 81, 92, (pl. 3, fig. 59); Schilder, 1953b: 563; Snow, 1877b: 16, 1878b: 63, and 1903: 192; Valenti, 1986a: 2; Wallis, 1961: 16, 51, (pl. 4, figs. 77, 78); Werner, K., 1993: 69, (pl. 21, fig. 164); Wickham, 1904b: 646; Wiesner, 1992: 131; Willis, 1967: 145, 260, 1968: 317, and 1970: 3, (fig. 8).
REDESCRIPTION: Leng, 1902a: 139, (pl. III).
BIOLOGY: Cutler, 1982: 34; Freitag and Tropea, 1969: 23; Hilchie, 1985: 324, 330, (figs. 7, 20); Johnson, W.N., 1975a: 21, and 1975b: 34; Knisley, 1984: 93; Kritsky and Simon, 1995: 146; Larochelle, 1974c: 25; Lawton, 1971b: 61, 66, and 1972b: 35, 39, 44; Lawton and Willis, 1974: 47, 48; Leng, 1902a: 139; Meserve, 1936: 272; Niemelä and Ranta, 1993: 87; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 412; Riley, 1877: 98; Smyth, 1905: 428, and 1908: 182; Spomer and Higley, 1993: 393; Vaurie, 1950b: 146; Wickham, 1899d: 217; Willis, 1967: 145, 260; Willis and Stamatov, 1971: 44.
HABITAT: Saline or alkaline soils (Wallis, 1961: 53).

fulgida pseudowillistoni Horn, W., 1938: 13, 49, pl. 75, fig. 7 (as subspecies of *C. fulgida* Say). Southern WY: Lake Como.
TYPE DEPOSITORY: IPZE (lectotype).
SEX OF TYPE: F.
TAXONOMY: Blackwelder, 1939: 8; Boyd et al., 1982: 9; Döbler, 1973: 379; Ferris, 1969: 10; Horn W., 1938: 13, (pl. 75, fig. 7); Kippenhan, 1995a: 37; Knudsen, 1985: 179, 186; Rivalier, 1954: 253; Schilder, 1953b: 563; Werner, K., 1993: 70, (pl. 21, fig. 165); Willis, 1967: 267.
REDESCRIPTION: Kippenhan, 1995a: 38.

fulgida rumppi Knudsen, 1985: 185, fig. 5 (as subspecies of *C. fulgida* Say). NM: Torrance Co., 7.2 mi. E. of Willard; NM.
TYPE DEPOSITORY: Norman L. Rumpp Collection (CASC).
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 56; Werner, K., 1993: 70, (pl. 21, fig. 167); Wiesner, 1992: 131.

HABITAT: Alkaline crust, often elevated on vegetation so that cicindelids could hide underneath (Knudsen, 1985: 186).

fulgida westbournei Calder, 1922b: 191 (replacement name for *C. fulgida elegans* Calder). MB: Westbourne; SK MB ND/ MN.

elegans Calder, 1922a: 62 (as new variety of *C. fulgida* Say; preoccupied DeFourcroy, 1785: 62). MB: Westbourne.

TYPE DEPOSITORY: Calder Collection.

TAXONOMY: Blackwelder, 1939: 8; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 56; Boyd et al., 1982: 9; Cazier, 1937c: 160; Criddle and Curran, 1923: 76; Dejean, 1825: 144; Fletcher, J. and Gibson, 1908: 108, and 1909: 99; Hooper, 1969: 3; Horn, W., 1926: 275, and 1930: 82; Huber, 1986: 55; Knaus, 1927: 114; Knudsen, 1985: 186; Larochelle, 1986a: 14, 1987a: 22, 23, and 1989b: 42, 44; Leng and Mutchler, 1927: 7; Schilder, 1953b: 563; Wallis, 1961: 51, 53, 70, (pl. 4, figs. 79-82); Werner, K., 1993: 70, (pl. 21, fig. 166); Wiesner, 1992: 131; Willis, 1967: 262.

BIOLOGY: Larochelle, 1978c: 23.

HABITAT: Small plain with many bare alkaline patches (Wallis, 1961: 53).

fulgida williamlarsi Knudsen, 1985: 182, fig. 2 (as subspecies of *C. fulgida* Say). NM: Sandoval Co., San Ysidro; NM.

TYPE DEPOSITORY: Norman L. Rumpp Collection (CASC).

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 56; Werner, K., 1993: 70, (pl. 21, fig. 168); Wiesner, 1992: 131.

HABITAT: Salt marshes and alkaline soil that flank Rio Salado River (Knudsen, 1985: 185).

fulgida winonae Knudsen, 1985: 184, fig. 3 (as subspecies of *C. fulgida* Say). NM: Valencia Co., Grants; NM.

TYPE DEPOSITORY: Norman L. Rumpp Collection (CASC).

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 56; Werner, K., 1993: 70, (pl. 21, fig. 169); Wiesner, 1992: 131.

HABITAT: Along the Rio San Jose, on salt marshes and in the town (Knudsen, 1985: 185).

hirticollis abrupta Casey, 1913: 31 (as subspecies of *C. gravida* LeConte). CA: Sacramento; CA.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

TAXONOMY: Bousquet and Larochelle, 1993: 56; Boyd et al., 1982: 7; Graves et al., 1988: 660, (figs. 17, 18); Harris, E.D. and Leng, 1916: 5; Horn, W., 1915: 375, 1926: 270, and 1930: 81; Leng, 1920: 40; Rumpp, 1962: 178; Schilder, 1953b: 560; Werner, K., 1993: 63, (pl. 15, fig. 116); Wiesner, 1992: 121.

BIOLOGY: Graves et al., 1988: 647.

hirticollis athabascensis Graves. Graves et al., 1988: 666, figs. 29, 35 (as subspecies of *C. hirticollis* Say). SK: Lake Athabasca, Thompson Bay Dunes; AB SK.

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

TAXONOMY: Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 56; Werner, K., 1993: 63, (pl. 15, fig. 121); Wiesner, 1992: 121.

BIOLOGY: Acorn, 1992: 217, 225, and 1994: 9.

hirticollis coloradula Graves. Graves et al., 1988: 668, figs. 30, 31, 36 (as subspecies of *C. hirticollis* Say). AZ: Navajo Co. Little Colorado River between Winslow and Holbrook; AZ.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 56; Werner, K., 1993: 63, (pl. 15, fig. 121); Wiesner, 1992: 121.

BIOLOGY: Graves et al., 1988: 647.

hirticollis corpuscula Rumpp, 1962: 174, fig. 2 (as subspecies of *C. hirticollis* Say). CA: Imperial Co., Potholes; CA NV/ UT/ AZ.

TYPE DEPOSITORY: CASC.

SEX OF TYPE: M.

TAXONOMY: Bertholf, 1983: 7, 11, (fig. 6); Bousquet and Larochelle, 1993: 56; Boyd et al., 1982: 7; Dunn, G.W., 1891: 154; Graves et al., 1988: 663, (fig. 25); Kippenhan, 1990a: 309, and 1994: 33; Richman, 1967: 89; Schwarz, 1891: 240; Tanner, V.M., 1929: 80; Werner, K., 1993: 63, (pl. 15, fig. 118); Wiesner, 1992: 121.

BIOLOGY: Graves et al., 1988: 647; Johnson, W.N., 1975b: 34; Schultz, 1986: 146.

HABITAT: Along Colorado River and its tributaries below and well above the Grand Canyon (Rumpp, 1961: 176).

hirticollis couleensis Graves. Graves et al., 1988: 669, figs. 4, 37 (as subspecies of *C. hirticollis* Say). WA: Vantage; WA OR ID.

TYPE DEPOSITORY: OSUO.

SEX OF TYPE: M.

IMMATURE STAGES: Leffler, 1979a: 75, (fig. 5F); Valenti, 1996b: 48.

TAXONOMY: Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 56; Leffler and Pearson, 1976: 34; Maser and Beer, 1984: 42, (fig. 8); Werner, K., 1993: 64, (pl. 15, fig. 122); Wiesner, 1992: 121.

BIOLOGY: Shook, 1981: 359.

hirticollis gravida LeConte, 1851: 170 (as species). CA: San Diego, ocean shore; CA; Mex.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 56; Boyd et al., 1982: 7; Cazier, 1954: 241, (figs. 27, 130); Cresson, 1861: 13; Fleutiaux, 1892: 89; Gemminger and Harold, 1868: 17; Graves et al., 1988: 659, (figs. 14, 15); Harris, E.D., 1911: 15; Horn, W., 1915: 375, 1926: 270, and 1930: 81; LeConte, 1858: 27, and 1860: 43, (fig. 26); Leng, 1902a: 151, and 1920: 40; Nagano, 1985: 107; Rumpp, 1962: 178; Schilder, 1953b: 560; Werner, K., 1993: 63, (pl. 14, fig. 114); Wiesner, 1992: 121.

BIOLOGY: Blaisdell, 1892: 49; Graves et al., 1988: 647; Moore, I., 1937: 3.

HABITAT: Along ocean beaches and bays; inland, for short distances along rivers on sand bars (Cazier, 1954: 241; Lawton, 1972b: 35, 43); clean, dry, light coloured sand; in areas close to or next to non-brackish water (Nagano, 1982: 36).

hirticollis hirticollis Say, 1817: 20 (as species). North America, common in Pennsylvania; MB/ MN WI MI ON/ IA MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ CT/ TX/ AR LA MS AL TN GA SC NC FL.

albohirta Dejean, 1826: 425 (as species). North America.

unita Kollar, 1836: 330 (as species). North America.

IMMATURE STAGES: Bram and Knisley, 1982: 99; Hamilton, C.C., 1925: 20, 55, (figs. 55-57, 91-93, 146); Harris, E.D., 1913b: 80; Johnson, W.N., 1977: 19, and 1978a: 30; Shelford, 1907: 11, and 1908: 167; Thompson, R.G., 1979: 237, (fig. 12); Valenti, 1996b: 46; Wilson, L.F., 1967: 239.

TAXONOMY: Acciavatti et al., 1992: 54-55, (fig. 1); Anonymous, 1919: 119; Ballou, 1931: 269; Beaulieu, 1900: 140; Bethune, 1870: 77, and 1873: 66; Bischoff, 1913: 314; Blackwelder, 1944: 18; Blatchley, 1910: 31, 35, (figs. 15a, 22); Bousquet and Larochelle, 1993: 56; Boyd, 1973: 5, and 1978: 199, 206, (fig. 6); Boyd et al., 1982: 7; Brown, 1830a: 231; Caron, 1951: 180, 183; Castle and Laurent, 1896: 300; Cazier, 1954: 240; Chagnon and Robert, 1962: 80, (fig. 5B), 375; Choate, 1975: 72; Ciegler, 1997: 184, 188, (fig. 5); Clarkson, 1885: 106; Cresson, 1861: 13; Davis, W.T., 1895: 140, 1912a: 18, 1915c: 154, 1919c: 75, and 1919d: 246; Dawson and W. Horn, 1928: 8; Dejean, 1831: 215, 256, and 1837: 3; Dillon and Dillon, 1961: 51, 54, (pl. V, fig. 5); Downie and Arnett, 1996: 81, (fig. 3.17); Eckhoff, 1939: 207, 214; Edwards, J.G., 1949: 73; Emmons, 1854: 36; Evans, J.E., 1903: 240; Fall, 1895: 179; Fattig, 1935: 154; Fletcher, J. and Gibson, 1908: 108, 113, and 1909: 99; Fleutiaux, 1892: 89; Freitag, 1965: 87, 101, 102, (figs. 8, 10); Gaumer and Murray, 1971: 9; Gemminger and Harold, 1868: 17; Gibson, 1917: 137; Glaser, 1976: 18, (fig. 1), and 1984: 66, 73; Gould, 1834: 49, (pl. 3, fig. 1); Goulet, 1983: 17, 22, (fig. 8); Graves,

1962: 1231, 1963: 496, 499, (fig. 6), 1965: 65, and 1988: 1; Graves and Brzoska, 1991: 10; Graves and Pearson, 1973: 159, 164, 166, (fig. 4); Graves et al., 1988: 655, (figs. 7-13); Haimbach, 1918: 40; Hamilton, J., 1889b: 104; Hanham, 1894: 350; Harris, E.D., 1911: 14-15, 1912c: 212, and 1916a: 101; Harris, E.D. and Leng, 1916: 5; Harris, T.W., 1852: 1, (fig. A); Hatch, 1924: 547; Hooper, 1969: 1; Horn, G.H., 1866: 396, 1876c: 127, and 1892: 28; Horn, W., 1893: 339, 1915: 375, 1926: 269, 1928: 11, 1930: 81, and 1938: 48, (pl. 73, fig. 7); Johnson, H.L., 1916: 113; Johnson, W.N., 1977: 19, and 1978a: 30; King, B.L., 1988: 44; Kirk, 1969: 7, and 1970: 7; Knaus, 1915a: 35, and 1916: 79; Knisley and Schultz, 1997: 93, 109, (photo. 11); Knisley et al., 1987a: 281, 283, (fig. 21); Kritsky et al., 1996: 29; Landry, L.P., 1979c: 46; Larochelle, 1971b: 6, 1972b: 52, 1973d: 139, 1974g: 87, 1975b: 25, 75, 1977c: 69-73, 1979: 14, 1980b: 41, 42, 1986c: 34-47, 1986d: 60, 1987a: 22-32, 1987b: 53-57, and 1989b: 41-47; Lawton, 1970b: 1, 3, 6; LeConte, 1848: 180, 1858: 27, and 1860: 43, (fig. 26); Leng, 1902a: 147, 151, (pl. II), 1912: 6, 10, 13, 1915: 560, and 1920: 40; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 93, (fig. 18); Liard, 1979a: 16; Löding, 1910: 131; Mather, 1971: 22; Montgomery and Montgomery, 1931: 358; Pearson et al., 1997: 36; Rivalier, 1954: 252; Rogers, R.V., 1880: 64, (fig. 13), and 1881: 24; Say, 1818: 411; Schaeffer, 1904b: 126; Schaupp, 1878f: 56, 1880: 79, 1881: 14, and 1884a: 82, 96, (pl. 3, fig. 66; pl. 5, figs. 137, a); Schilder, 1953b: 560; Sherman, F., 1904: 30; Shook, 1984: 159; Skinner, 1909: 185; Smith, J.B., 1909: 197; Summers, 1873: 132; Tanner, V.M., 1927: 10, (figs. 198, 207); Valenti, 1986a: 2; Wallis, 1961: 17, 25, 69, (pl. 3, figs. 49-50); Weed, 1892: 278; Werner, K., 1993: 63, (pl. 14, fig. 113); Wickham, 1894: 152, (fig. 16), and 1911: 5; Wiesner, 1992: 121; Williams, J., 1879: 39; Willis, 1967: 238, 1968: 316, and 1970: 3, (fig. 9); Wilson, D.A. and Brower, 1983: 6, 27, (fig. 3); Wolcott, 1896: 234.

REDESCRIPTION: Graves et al., 1988: 653; Leng, 1902a: 151, (pl. II).

BIOLOGY: Acciavatti et al., 1992: 55; Blanchard, 1921: 397; Blatchley, 1910: 35; Boyd, 1978: 206; Cartwright, 1935: 71; Criddle, 1907: 112; Fox, H., 1910: 80; Freitag and Tropea, 1969: 17, and 1971: 53; Glaser, 1976: 17, and 1984: 73; Graves, 1963: 499, and 1965: 65; Graves and Brzoska, 1991: 4, 5, 10, (fig. 14); Graves and Pearson, 1973: 166; Graves et al., 1988: 647; Hamilton, J., 1890: 142; Johnson, W.N., 1975a: 21, and 1977: 19; King, I.N., 1914: 319; Kirk, 1969: 7, and 1970: 7; Knisley, 1979: 211; Knisley and Schultz, 1997: 93, 109, (photo. 11); Knisley et al., 1987a: 281; Kritsky and Simon, 1995: 144, 146; Larochelle, 1972a: 8, 1973c: 6, 1974c: 26, 1974f: 84, 1975a: 3, 1980a: 36, and 1989a: 20; Lavigne, 1972: 3; Lawton, 1971b: 61, 66, and 1972b: 35, 37, 47; Lawton and Willis, 1974: 63-65; Leffler, 1975: 28; Liebeck, 1890: 159; Packard, 1889: 228; Pearson et al., 1988: 412; Robinson, 1975: 36; Schaupp, 1878a: 2; Shelford, 1907: 11, and 1915b: 244, (fig. 17); Smyth, 1908: 184; Valenti, 1986b: 24; Vaurie, 1950b: 147; Wickham, 1899d: 220, and 1900: 82; Will et al., 1995: 62; Wilson, D.A., 1975: 49; Wilson, D.A. and Brower, 1983: 6; Wilson, L.F., 1967: 239.

HABITAT: Dry, light-coloured sand, particularly whitish (Wallis, 1961: 25).

hirticollis rhodensis Calder, 1916: 93 (replacement name for *C. nigrita* Davis). RI: Point Judith to Narragansett Pier; MI ON PQ/ NB PE NS NF PM/ NY/ ME NH VT MA RI CT.

nigrita Davis, C.A., 1903: 273 (as variety of *C. hirticollis* Say; preoccupied Dejean, 1825: 58). RI: mudflats of Warwick.

shermani Casey, 1916: 30 (as species). MI: Marquette.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

TAXONOMY: Blackwelder, 1944: 18; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 56; Boyd et al., 1982: 7; Brown, 1930: 231; Davis, W.T., 1919c: 75; Dillon and Dillon, 1961: 51, 54, (pl. V, fig. 5); Downie and Arnett, 1996: 81; Dunn, G.A., 1981a: 3, (fig. 5), and 1986b: 28; Easton, 1909: 36; Freitag, 1972b: 1279, 1285, (figs. 17-20, 73-80); Frost, C.A., 1916: 381; Gould, 1834: 49; Graves, 1965: 65; Graves et al., 1988: 661, (figs. 19-24); Harris, E.D. and Leng, 1916: 5; Hatch, 1924: 547; Horn, W., 1926: 269, 1930: 81, and 1938: 48, (pl. 73, fig. 9); Huber, 1969a: 21, and 1986: 54; Jules, 1937: 2, 4, (fig. 4); Knaus, 1900a: 113; Larochelle, 1975b: 25, 75, 1976a: 77, (fig. 384), 1976b: 73, 76, (fig. 7), 1986c: 34, and 1987b: 53; Larson, D.J. and Langor, 1982: 594; Leng, 1920: 40; Lindroth, 1954a: 300; Provancher, 1870: 222; Rumpp, 1962: 178; Schilder, 1953b: 560; Werner, K., 1993: 63, (pl. 15, fig. 117); Wiesner, 1992: 121; Wilson, D.A. and Brower, 1983: 6, 27, (fig. 3).

BIOLOGY: Blanchard, 1921: 397; Dunn, G.A., 1978: 2; Freitag, 1972a: 21; Graves, 1965: 65; Graves et

al., 1988: 647; Lindroth, 1955: 18, and 1963: 12, 31, 39.

hirticollis shelfordi Graves. Graves et al., 1988: 664, figs. 26-28, 34 (as subspecies of *C. hirticollis* Say). OK: banks of Cimarron River, near Guthrie; AB SK MB MT ND SD/ MN WY CO/ NE KS IA MO/ NM TX OK.

TYPE DEPOSITORY: OSEC.
SEX OF TYPE: M.
TAXONOMY: Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 56; Bruner, 1901: 98; Drew and Van Cleave, 1961: 104, 106, 110, (fig. 14); Fall and Cockerell, 1907: 155; Hilchie, 1985: 323, 326, (fig. 11); Kippenhan, 1990a: 309, 1991: 11, (fig. 2), and 1994: 24, 33, (fig. 23); Kirk and Balsbaugh, 1975: 12; Knaus, 1924b: 171; Lantz, 1905: 258; Larochelle, 1989b: 45; Larson, P.R., 1981: 52; Meserve, 1936: 271; Snow, 1903: 192; Werner, K., 1993: 63, (pl. 15, fig. 119); Wiesner, 1992: 121.
BIOLOGY: Acorn, 1992: 217, 225; Hilchie, 1985: 326; Knisley, 1984: 93; Willis, 1967: 145.
HABITAT: On sand-bars (Popenoe, 1877: 22).

hirticollis siuslawensis Graves. Graves et al., 1988: 671, figs. 33, 38 (as subspecies of *C. hirticollis* Say). OR: Lane Co., 3 mi. N. of Florence; WA OR.

TYPE DEPOSITORY: AMNH.
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 56; Leffler and Pearson, 1976: 34; Maser and Beer, 1984: 42, (fig. 8); Werner, K., 1993: 64, (pl. 15, fig. 123); Wiesner, 1992: 121.

limbalis Klug, 1834: 29 (as species). North America; NT/ BC/ AB SK MB MT ND SD/ MN WI MI ON PQ/ NB NS NF/ WY UT CO/ NM NE KS IA MO IL IN OH KY/ NY PA NJ DC VA/ ME NH VT MA RI CT/ GA NC.

amoena LeConte, 1848: 177 (as species). Western MO.
TYPE DEPOSITORY: MCZC.

spreta LeConte, 1848: 177 (as species). ME: Eastport.

transversa Leng, 1902a: 131, pl. III (as variation of *C. purpurea* Olivier). IL/ NJ.
TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.

awemeana Casey, 1913: 23 (as subspecies of *C. limbalis* Klug). MB: Aweme.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

eldorensis Casey, 1913: 23 (as subspecies of *C. limbalis* Klug). CO: Eldora.
TYPE DEPOSITORY: USNM (type no. 45933).
SEX OF TYPE: M.

militaris Varas Arangua, 1929a: 242 (as variation of *C. purpurea limbalis* Klug). NY/ RI CT.

sedalia Smyth, 1933: 201 (as species). CO. Sedalia.

IMMATURE STAGES: Böving and Craighead, 1931: 94, (pl. 4, fig. c); Criddle, 1910: 13, and 1919: 101; Hamilton, C.C., 1925: 18, 25, (figs. 1-126); Larochelle, 1977a: 13; Shelford, 1907: 9, 1908: 164, and 1911: 557; Valenti, 1996b: 46.
TAXONOMY: Beaulieu, 1900: 139; Blackwelder, 1939: 7; Blanchard, 1921: 397; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 57; Boyd, 1978: 199, 211, (fig. 9); Boyd et al., 1982: 7, 8; Bruner, 1901: 98; Caron, 1951: 180, 182; Chagnon and Robert, 1962: 80, 374; Cresson, 1861: 19; Criddle and Curran, 1923: 76; Cutler, 1969a: 5, (figs. 1-4), and 1969b: 14; Dahl, 1941: 171; Davis, C.A., 1903: 271, 272; Davis, W.T., 1911b: 199, and 1912b: 137; Dawson and W. Horn, 1928: 8; Downie and Arnett, 1996: 80, 82, (fig. 3.26); Dunn, G.A., 1981a: 4, (fig. 17), and 1986b: 29; Eckhoff, 1939: 207, 212, 213; Evans, J.D., 1895: 142; Evans, J.E., 1906: 96; Fattig, 1935: 154; Ferris, 1969: 11; Fletcher, J., 1905: 56, and 1906: 90; Fleutiaux, 1892: 98, 99; Foster and Knowles, 1990: 838; Frost, C.A., 1916: 381, and 1920: 229; Fyles, 1891: 17; Gaumer and Murray, 1971: 9; Gemminger and Harold, 1868: 26; Gibson, 1912: 89, 1913: 113, and 1914: 106; Gistl, 1837: 31; Glaser, 1984: 66, 72; Goulet, 1983: 16, 21, (fig. 1); Graves, 1963: 496, 501, (fig. 14), and 1965: 66; Graves and Brzoska, 1991: 4, 6, 15, (fig. 19); Greene, 1914b: 237; Haimbach, 1908: 343; Hanham, 1894: 350; Harrington, 1882a: 8, and

1882b: 35; Harris, E.D., 1901b: 27, 1911: 6, 7, 1912a: 137, 1916b: 311, and 1918b: 237; Harris, E.D. and Leng, 1916: 4, 5; Harris, T.W., 1852: 1, (figs. K, N); Hatch, 1949: 113, and 1953: 38; Hilchie, 1985: 324, 329, (fig. 29); Hoffman, 1991: 176; Hooper, 1969: 2; Horn, W., 1903a: 193, 1915: 373, 374, 1926: 265, 266, 1930: 79, 80, and 1938: 48, (pl. 72, figs. 17, 20-24); Huber, 1986: 55; Johnson, W.N., 1979: 26; Jules, 1937: 2, 4, (fig. 5); Kippenhan, 1990a: 310, 1994: 24, 25, 47, (fig. 32), and 1996: 30; Kirk and Balsbaugh, 1975: 12; Knisley and Schultz, 1997: 93, 114; Knisley et al., 1987a: 281, 283, (fig. 22); Larochelle, 1972b: 55, 1974g: 87, 1975b: 25, 75, 1976a: 78, (fig. 395), 1976b: 75, 77, (fig. 18), 1977c: 68, 1979: 14, 1980a: 36, 1986a: 13, 1986c: 35-47, 1986d: 60, 1987a: 23-30, 1989a: 22, and 1989b: 42-46; Larson, P.R., 1981: 52; LeConte, 1848: 176, and 1860: 36, (fig. 13); Leng, 1902a: 131, 132, 135, (pl. III), 1910a: 73, 1918: 139, and 1920: 40; Leng and Beutenmüller, 1893: 92, 1894a: 43, and 1894b: 89, 92, (fig. 12); Leng and Mutchler, 1933: 9; Lindroth, 1954a: 300, and 1955: 16; Morgan, A.V., 1987: 360; Morgan, A.V. and Freitag, 1982: 106; Nagano et al., 1982: 342; Nicolay, 1916a: 98, 1931a: 267, and 1934: 129, 130; Nicolay and Weiss, 1932: 347; Notman, 1936: 254; Ouellet, 1902: 83; Pearson et al., 1997: 36; Pettit, 1869: 106; Provancher, 1870: 222; Rivalier, 1954: 253; Saunders, 1869: 13; Schaupp, 1884a: 80, 90, (pl. 2, figs. 42-44); Schilder, 1953b: 562; Schincariol, 1988: 1; Schincariol and Freitag, 1991: 1327, 1346; Scudder, 1869: 105; Shelford, 1917: 1; Skinner, 1904: 346; Smith, J.B., 1909: 197; Smyth, 1933: 197, and 1935: 14; Stevenson, 1904a: 73; Tanner, V.M., 1951: 49; Valenti, 1986a: 2; Varas Arangua, 1929a: 236-242; Wallis, 1961: 15, 42, 69, (pl. 2, figs. 34-36); Ward and Bowling, 1980: 31; Werner, K., 1993: 67, (pl. 19, fig. 153); Wickham, 1894: 151, and 1911: 5; Wiesner, 1992: 130; Willis, 1968: 316, and 1970: 4, (fig. 12); Wilson, D.A., 1970: 18.

BIOLOGY: Boyd, 1978: 211; Criddle, 1907: 110; Dunn, G.A., 1981a: 4; Freitag and Tropea, 1969: 15, 23; Glaser, 1984: 72; Graves, 1963: 501, and 1965: 66; Graves and Brzoska, 1991: 15; Harris, E.D., 1913c: 85; Hilchie, 1985: 329; Kennaught, 1963: 284; Kippenhan, 1990b: 54, (fig. 1); Knisley et al., 1987a: 281; Kuster, 1979: 297; Larochelle, 1972a: 8, 1974c: 27, and 1987a: 23; Leng, 1912: 7; Meserve, 1936: 271; Nelson and LaBonte, 1989: 51; Schincariol and Freitag, 1991: 1327; Shelford, 1907: 10, 1911: 551, 1913b: 125, (figs. 2, 8), 1915a: 294, (figs. 6, 7), and 1917: 1; Smyth, 1905: 425-429, and 1908: 180-183; Vaurie, 1950b: 148; Ward and Bowling, 1980: 31; Wickham, 1899d: 216; Willis and Stamatov, 1971: 46; Wilson, D.A., 1978: 14; Wilson, D.A. and Brower, 1983: 10, 18, 29, (fig. 9).

HABITAT: Steep and bare banks of heavy clay (Wallis, 1961: 42); clay surfaces and clay banks (Lawton, 1972b: 36, 37).

limbata albissima Rumpp, 1962: 181, fig. 3 (as subspecies of *C. limbata* Say). UT: Kane Co., Coral Pink Sand Dunes, 14 mi. S. of Mt. Carmel Junction; UT. Two paratypes (no. 7615) are deposited in CNCI (de Ruette, 1970: 30).

TYPE DEPOSITORY: CASC.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 7; Johnson, W.N., 1990a: 264, (figs. 8-10); Werner, K., 1993: 64, (pl. 15, fig. 127); Wiesner, 1992: 122; Willis, 1968: 312.

BIOLOGY: Acorn, 1992: 224, (fig. 11.2), and 1994: 13; Huber, 1989: 12.

HABITAT: Predominantly on the crest of the dunes and out on the flats (Lawton, 1972b: 41; Lawton and Willis, 1974: 45).

limbata hyperborea LeConte, 1863: 1 (as species). Methy Portage, Hudson's Bay Territory; NT/ AB SK MB/ NF.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Beaulieu, 1900: 153; Beaulne, 1914: 122; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 7; Fleutiaux, 1892: 94; Gibson, 1917: 137, and 1919: 97; Harris, E.D., 1911: 3; Hilchie, 1985: 323, 326, (fig. 13); Hooper, 1969: 2; Horn, G.H., 1866: 397, and 1892: 26, (fig. 5); Horn, W., 1900a: 117, 1903a: 196, 1915: 372, 1926: 264, and 1930: 79; Huber, 1986: 54; Johnson, W.N., 1990a: 263, (figs. 14-18); Larochelle, 1986c: 43, 1987a: 33, 1989a: 21, and 1989b: 45; Larson, D.J., 1986: 249; LeConte, 1875: 158, (fig. p. 158); Leng, 1902a: 152, 153, (pl. IV), 1902e: 248, and 1920: 40; Robinson and Murray, 1980: 27; Rumpp, 1961: 183; Schaupp, 1884a: 81, 92, (pl. 3, fig. 56; pl. 5, figs. 129a, b); Schilder, 1953b: 563; Wallis, 1961: 29, 69, (pl. 2, figs. 25, 26); Werner, K., 1993: 64, (pl. 15, fig. 125); Wickham, 1894: 153; Wiesner, 1992: 122; Willis, 1968: 312.

BIOLOGY: Acorn, 1992: 217, 224, (fig. 11.2), and 1994: 12; Hilchie, 1985: 326; Wickham, 1899d: 218.

HABITAT: Boreal forests; sandy blowouts along jack-pine ridges (Wallis, 1961: 29).

limbata labradorensis Johnson, W.N., 1990a: 261, figs. 19-21 (as subspecies of *C. limbata* Say). NF: Goose Bay. Type specimens previously treated as *C. l. hyperborea* (Larson, 1986).

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 57; Werner, K., 1993: 64, (pl. 16, fig. 130); Wiesner, 1992: 122.

limbata limbata Say, 1823: 141 (as species). Nebreska [sic] (Platte) and Arkansa Rivers; SD/ WY CO/ NE.

limbigera Gemminger and Harold, 1868: 20 (replacement name for *C. limbata* Say). Arkansas, Nebraska.

IMMATURE STAGES: Hamilton, C.C., 1925: 20, 56, (figs. 77, 114, 145); Valenti, 1996b: 47.

TAXONOMY: Austin, 1875: 33; Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 7; Bruner, 1901: 98; Crotch, 1861: 14; Fall, 1895: 179; Fleutiaux, 1892: 94; Freitag, 1965: 87, 101, 102, (figs. 5, 10), 1966: 942, (figs. 1, 6, 8, 13, 16, 20), and 1972b: 1279, 1292, (figs. 37-40, 113-120); Gemminger and Harold, 1868: 20; Harris, E.D., 1911: 3; Harris, E.D. and Leng, 1916: 4; Horn, W., 1900a: 117, 1915: 372, 1926: 263, 264, 1930: 79, and 1938: 48, (pl. 72, figs. 10-13); Huber, 1969a: 21; Johnson, W.N., 1990a: 263, (figs. 1-7); Kippenhan, 1990a: 310, and 1994: 24, 35, (fig. 25); Kirk and Balsbaugh, 1975: 12; Knaus, 1895: 284; Lantz, 1905: 258; Larochelle, 1977c: 69, 1980b: 40, and 1987a: 23-25; LeConte, 1848: 184, and 1860: 61; Leng, 1902a: 116, 152, and 1920: 40; Papp, H., 1952: 514; Pearson et al., 1997: 36; Rivalier, 1954: 253; Schaupp, 1884a: 81, 93, (pl. 3, fig. 55); Schilder, 1953b: 563; Wallis, 1961: 14, 16, 27, 69, (pl. 2, fig. 22); Werner, K., 1993: 64, (pl. 15, fig. 124); Wiesner, 1992: 121; Willis, 1968: 312, and 1970: 8, (fig. 27).

REDESCRIPTION: Leng, 1902a: 152, (pl. IV).

BIOLOGY: Acorn, 1992: 217, 224, (fig. 11.2), and 1994: 13; Kritsky and Simon, 1995: 146; Larochelle, 1987a: 23-25; Lawton, 1972b: 36, 37; Lawton and Willis, 1974: 47, 48; Meserve, 1936: 271; Pearson and Mury Meyer, 1979: 564; Vaurie, 1950b: 148; Wickham, 1899d: 218; Willis and Stamatov, 1971: 46.

HABITAT: Sandy dune areas (Kippenhan, 1994: 36).

limbata nympha Casey, 1913: 20 (as subspecies of *C. limbigera* Gemminger and Harold). MB: Aweme; AB SK MB MT ND/ MN.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

IMMATURE STAGES: Criddle, 1910: 12.

TAXONOMY: Beaulne, 1914: 122; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 7; Criddle, 1925a: 89; Evans, J.E., 1903: 240; Fletcher, J., 1902: 99; Fletcher, J. and Gibson, 1908: 113; Gibson, 1910: 110, and 1914: 106; Hilchie, 1985: 323, 326, (figs. 4, 12); Hooper, 1969: 1; Horn, W., 1915: 372, 1926: 264, and 1930: 79; Johnson, W.N., 1990a: 264, (figs. 11-13); Larochelle, 1989b: 42-44; Larson, P.R., 1981: 52; Leng, 1902a: 152, (pl. IV), and 1920: 40; Rumpp, 1961: 182; Schilder, 1953b: 563; Tanner, V.M., 1951: 50; Valenti, 1986a: 2; Wallis, 1961: 27, 69, (figs. 23, 24); Werner, K., 1993: 64, (pl. 15, fig. 126); Wiesner, 1992: 122; Willis, 1968: 312.

BIOLOGY: Acorn, 1991: 17, 1992: 217, 224, (fig. 11.2), and 1994: 13; Criddle, 1907: 109, and 1915: 25; Cutler, 1970: 10; Dunn, G.A., 1978: 2; Hilchie, 1985: 326; Kuster, 1979: 297; Larochelle, 1972c: 67; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 412.

HABITAT: Sandy areas, sand dune blowouts (Freitag and Tropea, 1971: 56; Hilchie, 1985: 326; Willis and Stamatov, 1971: 46).

longilabris laurentii Schaupp, 1884a: 87 (as variety of *C. longilabris* Say). CO; MT SD/ NV/ WY UT CO/ AZ NM.

oslari Leng, 1902a: 121 (as variety of *C. longilabris* Say). CO: San Juan and San Miguel Mts. (9,500-12,000 ft.). Four cotypes are in MCZC.

TYPE DEPOSITORY: AMNH (lectotype).

SEX OF TYPE: F.

vestalia Leng, 1902a: 121 (as variety of *C. longilabris* Say). MT: Maiden.

TYPE DEPOSITORY: AMNH (lectotype).

SEX OF TYPE: F.

densissima Casey, 1924: 12 (as subspecies of *C. oslari* Leng). Probably Colorado.
TYPE DEPOSITORY: USNM (type no. 45895).
SEX OF TYPE: F.

estesiana Casey, 1924: 13 (as subspecies of *C. oslari* Leng). CO.
TYPE DEPOSITORY: USNM (type no. 45896).
SEX OF TYPE: FM.

IMMATURE STAGES: Leffler, 1979a: 81; Valenti, 1996b: 48.

TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1983: 8, 13, (fig. 11); Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 6; Casey, 1913: 20; Dahl, 1941: 188, 189; Engelhardt, 1918: 230; Fall and Cockerell, 1890: 37, and 1907: 154; Fleutiaux, 1892: 93; Harris, E.D., 1911: 21, 1913a: 67, and 1913d: 311; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 41, (pl. III, figs. 14, 15); Horn, W., 1903a: 181, 195, 1915: 377, 1926: 273, 1930: 82, and 1938: 49, (pl. 74, figs. 10-15); Kippenhan, 1990a: 309, and 1994: 23, 25, (fig. 19); Kirk and Balsbaugh, 1975: 13; Knowlton and Wood, 1946: 91; LaRivers, 1946: 137; Larochelle, 1977c: 67-73, 1986a: 15, and 1986c: 39, 43; LeConte, 1866: 362; Leffler, 1979a: 474, and 1987: 6; Leffler and Pearson, 1976: 29; Leng, 1902a: 120, 121, (pl. III), 1908: 193, 1912a: 4, and 1920: 41; Leng and Mutchler, 1927: 7; Rumpp, 1979: 55; Schilder, 1953b: 562, 563; Snow, 1877b: 16; Spanton, 1988: 51, 123; Tanner, V.M., 1927: 10, (figs. 188, 204), 1928: 269, 1929: 82, and 1951: 49; Townsend, 1895: 39; Valenti, 1986a: 3; Wallis, 1961: 50, 70, (pl. 3, figs. 64, 65); Werner, K., 1993: 61, (pl. 13, fig. 99); Wickham, 1900b: 597; Wiesner, 1992: 109.

BIOLOGY: Fox, W.J., 1902a: 167; Johnson, W.N., 1975b: 34, and 1978a: 28; Knisley, 1984: 93; Lantz, 1905: 254; Larochelle, 1973b: 58; Lavigne, 1977: 25; Lawton and Willis, 1974: 54; Schultz et al., 1992: 226; Wickham, 1899d: 211.

HABITAT: Stony banks, roads and paths, at some distance from water (Wickham, 1899d: 211); Luvisols, Brunisols, and Podzols, soils of montane and subalpine forest and alpine meadows (Spanton, 1988: 122).

longilabris longilabris Say, 1824: 268 (as species). Inhabits N.W.T. (incl. Dakotas to Rocky Mts.); AK YT NT/ BC WA OR ID/ AB SK MB MT/ MN WI MI ON PQ/ NB PE NS NF/ NY/ ME NH VT.
TYPE DEPOSITORY: MCZC (neotype, designated by Spanton, 1988: 125-126).
SEX OF TYPE: M.

albilabris Kirby, 1837: 12 (as species). Taken at lat. 64 degrees and also in Canada.

novaterrae Leng, 1918: 140 (as variety of *C. longilabris* Say). NF: Bay St. George; NF.
TYPE DEPOSITORY: AMNH.

terracensis Casey, 1924: 13 (as subspecies of *C. oslari* Leng). BC: Terrace.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

IMMATURE STAGES: Spanton, 1988: 99, (figs. 28-32); Valenti, 1996b: 49.

TAXONOMY: Austin, 1874: 266; Beaulieu, 1900: 139; Bethune, 1870: 78; Blatchley, 1910: 30; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 57; Bowditch, 1896: 2; Boyd et al., 1982: 6; Brown, 1930a: 231, 1930b: 146, and 1932: 199; Caron, 1951: 180, 182; Casey, 1913: 17; Chagnon and Fournier, 1939: 84; Chagnon and Robert, 1962: 80, 374; Couper, 1869: 68; Cresson, 1861: 14; Criddle, 1925: 89; Criddle and Curran, 1923: 76; Dahl, 1941: 188; Davis, W.T., 1929: 86; Davis, W.T. and Shoemaker, 1918: 238; Dawson and W. Horn, 1928: 7; Downie and Arnett, 1996: 79, 81, (fig. 3.4); Dunn, G.A., 1981a: 4, (fig. 7), and 1986b: 27; D'urban and Bell, 1860: 10; Eckhoff, 1939: 204, 225; Emmons, 1854: 36; Evans, J.D., 1895: 142; Fall, 1926: 129; Fall and Cockerell, 1907: 154; Fletcher, J., 1905: 56; Fleutiaux, 1892: 93; Foster and Knowles, 1990: 838; Frost, C.A., 1935: 19; Fyles, 1891: 17; Gardiner, 1879: 211; Gemminger and Harold, 1868: 21; Goulet, 1983: 17, 22, (fig. 11); Graves, 1963: 496, 501, (fig. 10), and 1965: 67; Hanham, 1894: 350; Harrington, 1882a: 8, 1882b: 28, and 1890: 138; Harris, E.D., 1901b: 27, 1905a:100, 1905b: 168, 1911: 20, and 1918b: 237; Harris, E.D. and Leng, 1916: 6; Harris, T.W., 1852: 1, (fig. T); Hatch, 1924: 547, 1938: 235, (figs. 11, 13-15), and 1953: 40, (pl. III, fig. 13); Hilchie, 1985: 323, 327, (fig. 10); Hooper, 1969: 3; Horn, G.H.,

1876c: 127; Horn, W., 1915: 377, 1926: 272, 273, 1928: 11, 1930: 82, and 1938: 49, (pl. 74, fig. 9); Jules, 1937: 2, 4, (fig. 8); Landry, L.P., 1979c: 46; LaRivers, 1946: 137; Larochelle, 1972b: 57, 1974g: 87, 1975b: 25, 75, 1976a: 77, (fig. 379), 1976b: 73, 77, (fig. 2), 1977d: 42, 1980b: 40, 41, 1986a: 13, 15, 1986c: 37-48, 1986d: 60, 1987a: 22-32, and 1989b: 41-46; Larson, D.J. and Langor, 1982: 594; LeConte, 1848: 178, 1860: 33, (fig. 5), and 1861b: 338; Leffler, 1979a: 467, and 1987: 5; Leng, 1902a: 115, 119, 120, (pl. II, III), 1902e: 248, 1912a: 4, 8, 11, 1912b: 206, 1918: 141, and 1920: 41; Leng and Beutenmüller, 1893: 92, and 1894b: 88, 90, (fig. 6); Leng and Mutchler, 1927: 7; Liard, 1979b: 50; Lindroth, 1953: 169, 1954a: 300, 1954b: 365, 1955: 19, and 1963: 12, 24, 93; Macgillivray and Houghton, 1902: 249; Malkin, 1945: 92; Mason, 1922: 226; Nicolay, 1931c: 494; Notman, 1919: 92; Ouellet, 1902: 83; Papp, H., 1952: 520; Papp, R.P., 1978: 167; Pearson et al., 1997: 36; Provancher, 1870: 221; Rivalier, 1954: 252, (fig. 2); Saunders, 1869: 13; Schaupp, 1884a: 79, 86, (pl. 1, fig. 19); Schilder, 1953b: 562; Sherman, J.D., 1918: 238; Shoemaker and W.T. Davis, 1915: 157; Shook, 1984: 159; Slosson, 1894: 2; Spanton, 1988: 51, 123; Stevenson, 1904a: 73; Valenti, 1986a: 3; Venables, 1913: 267; Wallis, 1961: 13, 46, 70, (pl. 3, figs. 66-69); Werner, K., 1993: 60, (pl. 13, fig. 98); Wickham, 1894: 151; Wiesner, 1992: 109; Willis, 1968: 311; Wilson, D.A. and Brower, 1983: 6, 27, (fig. 1).

REDESCRIPTION: Leng, 1902a: 120, (pl. II, III); Schaupp, 1884a: 86.

BIOLOGY: Acorn, 1992: 217, and 1994: 9; Blanchard, 1921: 397; Cutler, 1969b: 14; Dunn, G.A., 1978: 2; Fox, W.J., 1902a: 167; Freitag and Tropea, 1969: 14-16, and 1971: 55; Graves, 1963: 501, and 1965: 67; Hilchie, 1985: 327; Kritsky and Simon, 1995: 146; Kuster, 1979: 297; Larochelle, 1972a: 8, 1974c: 28, 1974f: 84, 1975a: 2, 1977c: 67, 1978c: 25, and 1980a: 36; Lavigne, 1972: 3; Maser et al., 1971: 24; Nelson, 1988: 13; Pearson et al., 1988: 408, 412; Schultz et al., 1992: 226; Spanton, 1988: 99; Valenti, 1995: 67; Vaurie, 1950b: 149; Ward and Bowling, 1980: 31; Wickham, 1899d: 211; Wilson, D.A., 1978: 15.

HABITAT: Sandy areas in or adjacent to coniferous forests, especially where jack-pine is found (Wallis, 1961: 49); Podzolic soils (east), and Luvisols, Brunisols and Podzols, soils of montane and subalpine forest and alpine meadows in the west (Spanton, 1988: 122).

longilabris perviridis Schaupp, 1884a: 87, pl. 1, fig. 20 (as variety of *C. longilabris* Say). CA, OR, UT, NF; BC WA OR/ CA.

ostenta Casey, 1913: 17 (as species). CA.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

placerensis Casey, 1913: 18 (as subspecies of *C. perviridis* Schaupp). CA: Placer Co.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

columbiana Casey, 1924: 13 (as subspecies of *C. ostenta* Casey). BC.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

IMMATURE STAGES: Leffler, 1979a: 81; Valenti, 1996b: 48.

TAXONOMY: Beaulieu, 1900: 139; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 6; Casey, 1924: 13; Criddle, 1925a: 89; Dunn, G.W., 1891: 153; Engelhardt, 1918: 230; Fleutiaux, 1892: 93; Harris, E.D., 1911: 22; Harris, E.D. and Leng, 1916: 6; Hatch, 1938: 235, and 1953: 41, (pl. III, fig. II); Horn, W., 1903a: 192, 1915: 377, 1926: 273, 1930: 82, and 1938: 49, (pl. 74, figs. 16, 17); Larochelle, 1986a: 15, 1986c: 43, and 1989b: 42; LeConte, 1875: 157; Leffler, 1979a: 477, and 1987: 6; Leffler and Pearson, 1976: 29; Leng, 1902a: 120, 122, (pl. III), 1902e: 248, and 1920: 41; Leng and Beutenmüller, 1893: 92, and 1894b: 88, 90, (fig. 7); Leng and Mutchler, 1927: 7; Maser and Beer, 1984: 45, (fig. 12); Rivalier, 1954: 252; Schaeffer, 1908: 53; Schilder, 1953b: 562; Spanton, 1988: 51, 123, 129; Tanner, V.M., 1929: 81; Van Dyke, 1934: 45; Wallis, 1961: 50, 70, Werner, 1993: 61, (pl. 13, fig. 100); Wickham, 1894: 151; Wiesner, 1992: 109.

BIOLOGY: Nordin, 1985: 13; Wickham, 1899d: 211; Willis and Stamatov, 1971: 46.

HABITAT: Higher elevations on paths or clearings (Leffler and Pearson, 1976: 33).

nebraskana Casey, 1909: 268 (as subspecies of *C. longilabris* Say). NE; BC WA OR ID/ AB SK MB MT ND SD/ CA NV/ WY UT CO/ NE/ NM.

TYPE DEPOSITORY: USNM (type no. 45902).

SEX OF TYPE: F.

montana LeConte, 1861b: 338 (as species; preoccupied Charpentier, 1825: 182). Valleys of the Rocky Mountains.

TYPE DEPOSITORY: MCZC.

canadensis Casey, 1913: 17 (as subspecies of *C. montana* LeConte). AB: Calgary.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

spissitarsis Casey, 1913: 18 (as species). MB: Aweme.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

calgaryana Casey, 1914a: 18 (as species). AB: Lethbridge.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

uteana Casey, 1924: 12 (as subspecies of *C. montana* LeConte). UT: Provo.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

chamberlaini Knaus, 1925: 182 (as form of *C. longilabris* Say). OR: Harney Co., Stein Mountains. One paratype (no. 2056) is deposited in CNCI (de Ruette, 1970: 30).

IMMATURE STAGES: Leffler, 1979a: 83; Valenti, 1996b: 48.

TAXONOMY: Beaulieu, 1900: 153; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 6; Bruner, 1901: 98; Casey, 1914a: 17, 18; Dawson and W. Horn, 1928: 7; Evans, J.E., 1903: 240; Ferris, 1969: 11; Fletcher, J., 1903: 87, and 1905: 56; Fletcher, J. and Gibson, 1908: 107, and 1909: 99; Fleutiaux, 1892: 93; Gemminger and Harold, 1868: 22; Gibson, 1913: 113, 1914: 106, 1915: 123, and 1916: 194; Harris, E.D., 1911: 20; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 40; Hilchie, 1985: 322, 328, (figs. 6, 9); Hooper, 1969: 3; Horn, W., 1915: 377, 444, 1926: 273, 1928: 11, and 1930: 82; Huber, 1969a: 21, and 1986: 54; Kippenhan, 1990a: 309, 1994: 23, 28, (fig. 18), and 1996: 30; Kirk and Balsbaugh, 1975: 13; Knowlton and Wood, 1946: 91; Larochelle, 1986a: 14, 1987a: 23-33, and 1989b: 43-45; Larson, P.R., 1981: 52; LeConte, 1861a: 338, and 1875: 157; Leech, 1947: 108; Leffler, 1979a: 484, 486, and 1987: 6; Leffler and Pearson, 1976: 33; Leng, 1902a: 120, 122, and 1920: 41; Leng and Mutchler, 1927: 7, and 1933: 9; Mank, 1934: 74; Mauer and Beer, 1984: 51, 54, (fig. 13); Papp, H., 1952: 520; Pearson et al., 1997: 36; Schaupp, 1884a: 87, (pl. 5, fig. 126); Schilder, 1953a: 314, and 1953b: 562, 563; Scudder, 1869: 53; Shook, 1984: 159; Spanton, 1988: 51, 131; Stevenson, 1904a: 73; Sumlin, 1976a: 102; Tanner, V.M., 1927: 10, (figs. 187, 212), and 1929: 81; Wallis, 1961: 13, 49, 70, (pl. 3, figs. 60-62, 65); Werner, K., 1993: 61, (pl. 13, fig. 101); Wickham, 1894: 153; Wiesner, 1992: 109; Willis, 1968: 311.

BIOLOGY: Acorn, 1991: 23; Criddle, 1907: 112; Hilchie, 1985: 328; Leng, 1902a: 122; Meserve, 1936: 272; Nordin, 1985: 13; Pearson et al., 1988: 412; Valenti, 1995: 67; Wickham, 1899d: 212.

HABITAT: Short grass plains; extends westward into valleys and up into mountains; prefers heavy clay soil (Wallis, 1961: 51); where chernozemic soils are dominant (Spanton, 1988: 122).

nigrior Schaupp, 1884a: 79, 87, pl. 2, fig. 27 (as variety of *C. scutellaris* Say). GA; GA SC NC FL.

TAXONOMY: Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 9; Ciegler, 1997: 184, 188, (fig. 19); Fattig, 1935: 154; Fleutiaux, 1892: 96; Harris, E.D., 1911: 26; Harris, E.D. and Leng, 1916: 8; Horn, W., 1915: 380, 1926: 78, and 1930: 83; Johnson, F.H., 1894: 142; Knisley and Schultz, 1997: 92, 116, (photo. 16); Larochelle, 1986c: 42, 45; Leng, 1902a: 125, 1915: 559, and 1920: 41; Loding, 1910: 131; Pearson et al., 1997: 36; Rivalier, 1954: 254; Schilder, 1953b: 562; Vick and Roman, 1985: 27; Werner, K., 1993: 71, (pl. 22, fig. 183); Wiesner, 1992: 132.

BIOLOGY: Knisley and Schultz, 1997: 92, 116, (photo. 16); Meserve, 1936: 272; Wickham, 1899d: 121.

HABITAT: Found on well-packed sand with considerable clay (Vick and Roman, 1985: 27).

ohlone Freitag and Kavanaugh. Freitag et al., 1993: 113, figs. 1-5 (as species). CA: Santa Cruz Co., Soquel, Grassy Terrace, Winkle Avenue; CA.

TYPE DEPOSITORY: CASC.

SEX OF TYPE: M.

TAXONOMY: Pearson et al., 1997: 36.
HABITAT: Trails and trampled areas of poorly drained clay or sandy clay soil over bedrock in remnant stands of open native grassland (Freitag et al., 1993: 117).

oregona guttifera LeConte, 1860: 42, fig. 23 (as species). NM: Santa Fe; AK YK NT/ BC ID/ AB MT/ WY UT CO/ NM.
TYPE DEPOSITORY: MCZC.

sterope Casey, 1913: 28 (as species). KS.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

audax Casey, 1913: 29 (as species). CO.
TYPE DEPOSITORY: USNM (type no. 45980).
SEX OF TYPE: FM.

oregonella Casey, 1924: 16 (as subspecies of *C. oregona* LeConte). UT: Provo Canyon, Deer Creek.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.
TAXONOMY: Acciavatti et al., 1979: 30; Bates, 1884: 258; Blaisdell, 1892: 48; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 7; Cazier, 1954: 242; Cresson, 1861: 13; Dunn, G.W., 1891: 154; Fall, 1895: 179; Fleutiaux, 1892: 91; Freitag, 1965: 111; Griffith, 1900: 565; Harris, E.D., 1911: 12; Harris, E.D. and Leng, 1916: 7; Hatch, 1953: 41; Hilchie, 1985: 324, 325, (figs. 15, 16); Horn, G.H., 1866: 397; Horn, W., 1902a: 234, 1903a: 185-194, 1915: 378, 1926: 274, and 1930: 82; Horn, W. et al., 1897: 165; Kippenhan, 1990a: 309, and 1994: 23, 31, (fig. 22); Knaus, 1913: 89; Larochelle, 1977c: 68; Leffler, 1979a: 274; Leng, 1902a: 149, and 1920: 40, 41; Leng and Mutchler, 1927: 7; Schaupp, 1884a: 81, 94, (pl. 3, fig. 65; pl. 5, fig. 134); Schilder, 1953b: 562; Snow, 1877b: 17; Tanner, V.M., 1929: 83, 84; Varas Arangua, 1929a: 250, and 1929b: 394; Wallis, 1961: 22, 24, 69, (pl. 3, figs. 73, 74); Werner, K., 1993: 62, (pl. 14, fig. 107); Wiesner, 1992: 120; Willis, 1968: 311, (fig. 19).
BIOLOGY: Hilchie, 1985: 325; Johnson, W.N., 1975b: 34; Knisley, 1984: 93; Lawton and Willis, 1974: 49; Leffler, 1975: 29; Wickham, 1899d: 219.
HABITAT: Riparian; wet sandy places, along banks of rivers (Wickham, 1899d: 219; Willis and Stamatov, 1971: 48).

oregona maricopa Leng, 1902a: 150 (as geographical race of *C. oregona* LeConte). AZ: Phoenix; CA NV/ UT/ AZ NM.
TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.

provensis Casey, 1924: 15 (as species). UT: Parowan and Provo Canyon.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

mormonella Casey, 1924: 15 (as subspecies of *C. provensis* Casey). UT: Eureka, Provo Canyon, Parowan and Vineyard.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

nephiana Casey, 1924: 16 (as subspecies of *C. provensis* Casey). UT: Parowan.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1983: 17, (fig. 17); Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 7; Casey, 1913: 30; Dahl, 1941: 189; Fall and Cockerell, 1907: 155; Freitag, 1965: 111; Harris, E.D., 1911: 13; Harris, E.D. and Leng, 1916: 7; Horn, W., 1903a: 187, 1915: 378, 1926: 274, 1930: 82, and 1938: 49, (pl. 74, fig. 22); Knowlton and Wood, 1946: 91; Larochelle, 1986c: 47; Leng, 1902a: 147, 150, and 1920: 41; Leng and Mutchler, 1927: 7, and 1933: 9; Rivalier, 1954: 252; Schaeffer, 1908: 53; Schilder, 1953b: 562; Schultz, 1988: 25; Sumlin, 1976a: 102; Tanner, V.M., 1927: 10, (figs. 197, 214), and 1929: 83, 84; Varas Arangua, 1929a: 250, and 1929b: 394; Werner, K., 1993: 62, (pl. 14, fig. 108); Wiesner,

1992: 120.

BIOLOGY: Hadley and Schultz, 1987: 677; Huber, 1989: 12; Schultz, 1986: 146; Smyth, 1905: 432, and 1908: 180-181.

HABITAT: Banks of streams and edges of standing water (Lawton, 1972b: 41; Lawton and Willis, 1974: 53; Leffler, 1975: 30).

oregona navajoensis Van Dyke, 1947: 155 (as subspecies of *C. oregona* LeConte). AZ: Kayenta; UT/ AZ NM. Allotype (no. 5865) is deposited in CASC.

TYPE DEPOSITORY: CASC (type no. 5864).

SEX OF TYPE: M.

TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1983: 17; Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 7; Freitag, 1965: 111; Kippenhan, 1990a: 309, and 1994: 31; Larochelle, 1986a: 16; Werner, K., 1993: 62, (pl. 14, fig. 109); Wiesner, 1992: 120.

BIOLOGY: Hadley and Schultz, 1987: 677; Schultz, 1986: 146.

oregona oregona LeConte, 1860: 41, fig. 22 (as species). Oregon Terr. and N. CA, as far as San Francisco; BC WA OR ID/ AB MT/ CA NV/ WY UT; Mex.

TYPE DEPOSITORY: MCZC.

scapularis Casey, 1909: 272 (as subspecies of *C. depressula* Casey). CA.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

sonoma Casey, 1913: 29 (as subspecies of *C. guttifera* LeConte). CA: maritime regions N. of San Francisco.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

quadripennis Casey, 1913: 30 (as species). NV: Hawthorne.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

ovalipennis Casey, 1913: 30 (as species). NV: Hawthorne.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

IMMATURE STAGES: Hamilton, C.C., 1925: 18, 38, (figs. 67, 104, 134); Leffler, 1979a: 72, (figs. 5B, 7B, C); Maser, 1977c: 63; Valenti, 1996b: 47, 48.

TAXONOMY: Anonymous, 1906a: 226; Beaulieu, 1900: 154; Bousquet, 1991: 8, 9; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 6; Cazier, 1954: 242, (fig. 30); Cresson, 1861: 15; Davis, A.C., 1931: 187; Dunn, G.W., 1891: 154; Engelhardt, 1918: 230; Fall, 1895: 179, and 1901: 308; Fletcher, J., 1905: 56; Fleutiaux, 1892: 91; Freitag, 1965: 87, 101, 102, 111, (figs. 2, 10, 12, 14, 16), and 1972b: 1279, 1282, (figs. 9-12, 57-64); Harris, E.D., 1911: 12; Harris, E.D. and Leng, 1916: 7; Hatch, 1938: 235, (figs. 16, 17), and 1953: 41, (pl. II, fig. 2; pl. III, fig. 16); Hicks, 1955: 12; Hilchie, 1985: 324, 325, (figs. 15, 16); Horn, G.H., 1866: 396; Horn, W., 1902a: 234, 1902b: 380-395, 1903a: 180-192, 1903c: 215, 1915: 377, 378, 1926: 274, 1930: 82, and 1938: 49, (pl. 74, figs. 19-21); Ingram, 1934: 51; Kippenhan, 1990a: 309; Knowlton and Wood, 1946: 91, 92; LaRivers, 1946: 137; Larochelle, 1977c: 65-73, 1986a: 15, 1986c: 38, 1987a: 25-33, 1987b: 52, 1989a: 20, and 1989b: 43; LaRue, 1994b: 3; LeConte, 1860: 41; Leffler, 1979a: 274; Leffler and Pearson, 1976: 38; Leng, 1902a: 147, 149, (pl. III), and 1920: 41; Maser and Beer, 1984: 51, (fig. 22); Murray, 1979: 49; Nagano et al., 1982: 340, and 1985: 105; Papp, H., 1952: 514; Papp, R.P., 1978: 167; Pearson et al., 1997: 36; Rivalier, 1954: 252, 254, (fig. 2b); Schaupp, 1884a: 81, 94, 108, (pl. 3, fig. 64; pl. 5, fig. 133); Schilder, 1953b: 562; Shook, 1984: 159; Stevenson, 1904a: 73; Sumlin, 1976a: 101; Tanner, V.M., 1927: 10, (fig. 208), and 1929: 83; Taylor, 1886: 34; Valenti, 1986a: 3; Varas Arangua, 1929a: 247, and 1929b: 394; Venables, 1913: 267; Wallis, 1961: 13, 22, 24, 69, (pl. 3, figs. 70-72); Werner, K., 1993: 62, (pl. 13, fig. 106); Wickham, 1890: 169, and 1894: 153; Wiesner, 1992: 120; Willis, 1968: 3, (fig. 19), and 1970: 8; Willis and Stamatov, 1971: 47; Wright and Coolidge, 1908: 66.

REDESCRIPTION: Freitag, 1965: 111.

BIOLOGY: Freitag, 1965: 111; Freitag and Tropea, 1971: 55; Hilchie, 1985: 325; Ingram, 1934: 51; Johnson, W.N., 1975a: 22; LaRivers, 1946: 137; Larochelle, 1973a: 32; Lawton, 1972b: 42-

44; Maser, 1973b: 73, 1976a: 10, 1976b: 13, and 1977c: 61; Moore, I., 1937: 3; Murray, 1979: 49; Nagano, 1982: 35; Nelson and Coope, 1982: 146; Palmer, 1981: 35; Pearson, 1988: 130; Pearson et al., 1988: 412; Schultz, 1986: 144, (fig. 3); Schultz and Bernard, 1989: 72; Schultz and Hadley, 1987a: 363; Shook, 1981: 359; Tanner, V.M., 1928: 269; Valenti, 1994: 18, (fig. 1); Vaurie, 1950b: 150; Wickham, 1899d: 219.

HABITAT: Gravelly sandy banks, bare rock, along streams, springs, lakes or ocean beaches (Freitag, 1965: 112); sea beaches and on tidal flats and prefers dark moist sand (Nagano, 1982: 35).

parowana parowana Wickham, 1905: 165 (as species). UT: near Parowan, sand beaches of Little Salt L.; WA OR ID/ NV/ UT. One syntype is deposited in IPZE and syntypes are deposited in USNM.

TYPE DEPOSITORY: USNM (type no. 56136).

SEX OF TYPE: M.

IMMATURE STAGES: Leffler, 1979a: 84; Valenti, 1996b: 48.

TAXONOMY: Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 9; Cazier, 1937c: 160, (pl. 36, fig. 5); Dahl, 1940: 80; Döbler, 1973: 379; Engelhardt, 1918: 230; Erwin and House, 1978: 237; Harris, E.D. and Leng, 1916: 7; Hatch, 1938: 234, (fig. 12), and 1953: 39, (pl. III, fig. 12); Horn, W., 1915: 378, 1926: 275, 1930: 82, and 1938: 49, (pl. 75, fig. 8); Knaus, 1922: 197; LaRivers, 1946: 138; Larochelle, 1986c: 38, 47; Leffler, 1979a: 507, and 1987: 7; Leng, 1920: 41; Pearson et al., 1997: 36; Rivalier, 1954: 253; Schilder, 1953b: 563; Tanner, V.M., 1929: 85; Wallis, 1961: 53; Werner, K., 1993: 70, (pl. 21, fig. 170); Wiesner, 1992: 131; Willis, 1968: 316.

BIOLOGY: Johnson, W.N., 1975a: 22, 23.

HABITAT: Prefers alkaline soil (Lawton and Willis, 1974: 53; Wallis, 1961: 54).

parowana platti Cazier, 1937c: 161, pl. 36, fig. 6 (as subspecies of *C. parowana* Wickham). CA: Mono Co., Benton's Crossing; OR/ CA NV. A female allotype is in AMNH; and one paratype (no. 5381) is in CNCI (de Ruette, 1970: 30).

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 9; Döbler, 1973: 399; Douglas, 1996: 10; Horn, W., 1938: (pl. 75, fig. 1); Leffler, 1979a: 504, and 1987: 7; Robinson and Murray, 1980: 27; Schilder, 1953b: 563; Sumlin, 1976a: 102; Werner, K., 1993: 70, (pl. 21, fig. 173); Wiesner, 1992: 131.

HABITAT: Slopes of hillsides, near water, where soil is dry, powdery and sparsely covered with stubbles of grass (Cazier, 1936a: 162); alkaline soil surrounding the Monte Neva Hot Springs (Lawton and Willis, 1974: 52).

parowana remittens Casey, 1924: 14 (as subspecies of *C. parowana* Wickham). UT: Callao; UT.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

TAXONOMY: Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 9; Cazier, 1936b: 160; Hatch, 1953: 39; Horn, W., 1926: 275, 1930: 82, and 1938: 49, (pl. 75, fig. 9); Leng and Mutchler, 1927: 7, and 1933: 9; Schilder, 1953b: 563; Tanner, V.M., 1929: 85; Werner, K., 1993: 70, (pl. 21, fig. 171); Wiesner, 1992: 131.

parowana wallisi Calder, 1922b: 191 (replacement name for *C. azurea* Calder). BC: Penticton; BC WA OR. *azurea* Calder, 1922a: 62 (as species; preoccupied Krausse, 1910: 161). BC: Penticton.

TYPE DEPOSITORY: CNCI (type no. 7315).

TAXONOMY: Blackwelder, 1939: 8; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 58; Boyd et al., 1982: 9; Criddle and Curran, 1923: 76; Gibson, 1910: 110; Hatch, 1953: 40; Horn, W., 1926: 275, and 1930: 82; Huber, 1969a: 20, and 1986: 55; Larochelle, 1987a: 22, and 1989b: 42, 44; Leffler, 1979a: 506, and 1987: 7; Leffler and Pearson, 1976: 50; Leng and Mutchler, 1927: 7; Maser and Beer, 1984: 48, (fig. 16); Schilder, 1953b: 563; Shook, 1984: 159; Wallis, 1961: 53, 54, 70, (pl. 4, fig. 83); Werner, K., 1993: 70, (pl. 21, fig. 172); Wiesner, 1992: 131.

HABITAT: Paths in alkaline soils (Wallis, 1961: 54).

patruela consentanea Dejean, 1825: 63 (as species). North America; NY NJ.

TAXONOMY: Bousquet and Larochelle, 1993: 58; Boyd, 1973: 6, and 1978: 214, (fig. 11); Boyd et al., 1982: 8; Cresson, 1861: 16; Davis, W.T., 1899: 176, 1914b: 63, 1915a: 71, 1915d: 156, and

1916a: 100; Dawson and W. Horn, 1928: 7; Downie and Arnett, 1996: 80, 82; Fleutiaux, 1892: 97; Gemminger and Harold, 1868: 26; Glaser, 1984: 75; Hamilton, J., 1889a: 29, and 1889b: 104; Harris, E.D., 1905a: 100, and 1911: 32; Harris, E.D. and Leng, 1916: 8; Horn, W., 1915: 381, 1926: 280, and 1930: 83; Johnson, W.N., 1990b: 27; Kaulbers, 1982: 2; Kaulbars and Freitag, 1993b: 267; Knisley and Schultz, 1997: 92, 117; Larochelle, 1986c: 34-43, 1987a: 26, and 1987b: 52, 56; LeConte, 1848: 178, and 1860: 36, (fig. 12); Leng, 1902a: 130, 1912: 14, and 1920: 41; Leng and Beutenmüller, 1893: 92, and 1894b: 89, 90; Liebeck, 1890: 159; Malkin, 1941: 28; Schaupp, 1884a: 80, 89, (pl. 2, fig. 36); Schilder, 1953b: 562; Skinner, 1897: 231; Smith, J.B., 1909: 197; Werner, K., 1993: 69, (pl. 20, fig. 159); Wiesner, 1992: 131.

BIOLOGY: Boyd, 1978: 214; Fox, H., 1910: 82; Glaser, 1984: 75; Harris, E.D., 1913c: 85; Knisley and Schultz, 1997: 92, 117; Leng, 1902a: 130, and 1902d: 238; Pearson et al., 1988: 412; Weidt, 1899: 22; Wickham, 1899d: 214.

HABITAT: Dark soil on edges of woods; bare spots in woods (Wickham, 1899d: 214).

patruela patruela Dejean, 1825: 62 (as species). North America; MN WI MI ON/ IN OH KY/ NY PA NJ MD DC WV VA/ NH VT MA RI CT/ TN GA SC NC.

montana Hentz, 1869: 53 (as species; preoccupied Charpentier, 1825: 182). NC: Pilot Mountain.

huberi Johnson, W.N., 1990b: 27 (as subspecies of *C. patruela* Dejean). WI: 2.4 mi. southwest of Mather, Monroe County; WI.

TYPE DEPOSITORY: FSCA.

SEX OF TYPE: M.

IMMATURE STAGES: Valenti, 1996b: 48; Willis, 1980: 49.

TAXONOMY: Acciavatti et al., 1992: 54, 62, (fig. 7); Blatchley, 1910: 30, 32; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 58; Boyd, 1978: 199, 214; Boyd et al., 1982: 8; Ciegler, 1997: 184, 188, (fig. 11); Cresson, 1861: 16; Davis, C.A., 1903: 271; Dawson and W. Horn, 1928: 7; Downie and Arnett, 1996: 80, 82, (fig. 3.12); Dunn, G.A., 1981a: 6, (fig. 10), and 1986b: 29; Eckhoff, 1939: 206, 226; Edwards, J.G., 1949: 73; Emmons, 1854: 35; Fattig, 1935: 154; Fleutiaux, 1892: 97; Gemminger and Harold, 1868: 26; Glaser, 1984: 66, 75; Gould, 1834: 44, (pl. 3, fig. 4); Goulet, 1983: 17, 21, (fig. 3); Graves, 1963: 496, 503, (fig. 8), and 1965: 66; Graves and Brzoska, 1991: 18; Harris, E.D., 1911: 32, 1912a: 137, and 1918b: 237; Harris, E.D. and Leng, 1916: 8; Harris, T.W., 1852: 1, (fig. P); Hoffman, 1991: 176; Hood, L.E., 1903: 115; Horn, W., 1903a: 185, 1915: 381, 1926: 279, 280, 1928: 12, 1930: 83, and 1938: 49, (pl. 75, fig. 22); Huber, 1986: 55; Kaulbers, 1982: 1; Kaulbars and Freitag, 1993b: 267; Kirk, 1970: 8; Knisley and Schultz, 1997: 92, 117, (photo. 17); Knisley et al., 1987a: 281, 283; Larochelle, 1980b: 42, 1986c: 38-46, 1986d: 60, 1987a: 33, 1987b: 56, and 1989b: 45, 47; Lawton, 1970a: 1; LeConte, 1848: 178, and 1860: 36, (fig. 12); Leng, 1902a: 115, 128, 129, (pl. III), 1910a: 73, 1918: 140, and 1920: 41; Leng and Beutenmüller, 1893: 92, and 1894b: 88, 91, (fig. 10); Liebeck, 1890: 158; Malkin, 1941: 28; Meserve, 1936: 273; Montgomery and Montgomery, 1931: 359; Nicolay, 1916a: 98, 1916b: 18, 1923: 118, and 1931c: 494; Pearson et al., 1997: 36; Rivalier, 1954: 253; Schaupp, 1884a: 80, 89, (pl. 2, fig. 35); Schilder, 1953b: 562; Sherman, F., 1904: 28; Smith, J.B., 1909: 197; Townsend, 1884b: 231, and 1889: 231; Valenti, 1986a: 3; Wallis, 1961: 13, 33, 69, (pl. 4, fig. 95); Ward and Bowling, 1980: 29, 31, (fig. 1); Werner, K., 1993: 69, (pl. 20, fig. 158); Wickham, 1894: 153; Wiesner, 1992: 131; Willis, 1968: 311, and 1980: 49, (figs. 1-6).

BIOLOGY: Acciavatti et al., 1992: 62; Blanchard, 1921: 397; Blatchley, 1910: 33; Boyd, 1978: 214; Cartwright, 1935: 73; Glaser, 1984: 75; Graves, 1963: 503, and 1965: 66; Graves and Brzoska, 1991: 18; Knisley and Schultz, 1997: 92, 117, (photo. 17); Knisley et al., 1987a: 281, and 1990: 911; May et al., 1986: 171; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 408, 412; Sherman, F., 1908: 361; Wickham, 1899d: 214; Wilson, D.S., 1978: 128.

HABITAT: Patches of sand and clay soils in margins of jackpine stands (Wallis, 1961: 33).

pimeriana LeConte, 1866: 363 (erroneously described as *C. viatica* Chevrolat by LeConte, 1860: 62). Sonora; AZ NM; Mex.

TYPE DEPOSITORY: MCZC.

cochisensis Casey, 1909: 274 (as species). AZ: Douglas.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 519, (figs. 56-61); Valenti, 1996b: 49.

TAXONOMY: Bertholf, 1983: 7, 18, (fig. 18); Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 9; Cazier, 1954: 242, (figs. 31, 134); Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 97; Gemminger and Harold, 1868: 24; Harris, E.D., 1911: 24, 34; Harris, E.D. and Leng, 1916: 7; Horn, W., 1903a: 197, 1915: 378, 379, 1926: 276, 1930: 82, and 1938: 49, (pl. 75, fig. 12); Huber, 1986: 55; Knaus, 1906a: 145; Larochelle, 1987a: 29; Leng, 1902a: 115, 126, 127, and 1920: 41; Papp, H., 1952: 519; Pearson et al., 1997: 36; Schaupp, 1884a: 80, 88, (pl. 1, fig. 24); Schilder, 1953b: 562; Werner, K., 1993: 69, (pl. 20, fig. 163); Willis, 1968: 317.

BIOLOGY: Johnson, W.N., 1975b: 35, and 1978a: 29; Knaus, 1906: 147; Knisley, 1985a: 337; Kritsky and Simon, 1995: 146; Larochelle, 1985: 67; Lawton and Willis, 1974: 57, 58; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson and Mury Meyer, 1979: 558, (fig. 1); Pearson et al., 1988: 412; Serrano and Yadov, 1984: 337; Shelly and Pearson, 1978: 791; Smith, S.G., 1953: 33; Smith, S.G. and Edgar, 1954: 657; Smyth, 1908: 186-188, and 1934: 102; Stevens, 1906: 44, (pl. XIII, figs. 198-206); Yadav et al., 1985: 5.

HABITAT: Usually bare sandy soil in vicinity of water (Cazier, 1954: 243).

plutonica leachi Cazier, 1936: 124 (as subspecies of *C. plutonica* Casey). CA: Modoc Co., Warner Mts. (9,000 to 10,000 ft.); OR/ CA NV.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: F.

TAXONOMY: Beer and Maser, 1973: 33; Blackwelder, 1939: 7; Boyd et al., 1982: 8; Douglas, 1996: 10; Horn, W., 1938: 49, (pl. 74, figs. 5, 6); Leffler, 1987: 5; Maser and Beer, 1984: 48, (fig. 14); Schilder, 1953b: 563; Sumlin, 1976a: 102; Werner, K., 1993: 67, (pl. 18, fig. 149); Wiesner, 1992: 129.

BIOLOGY: LaRivers, 1946: 136; Larochelle, 1986a: 12.

HABITAT: Best known elevation in Nevada is 4,500 ft., while its typical environment of semi-alkaline aspect is in contrast to its observed preferences at higher altitudes where it seems to inhabit more frigid environs on open, exposed slopes (LaRivers, 1946: 137).

plutonica plutonica Casey, 1897: 296 (as species). CA: Placer Co.; OR ID/ CA NV.

TYPE DEPOSITORY: USNM.

TAXONOMY: Andrews, F.G., 1975: 39; Beer and Maser, 1973: 33; Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Cazier, 1936: 123, and 1939a: 28; Dahl, 1940: 80; Harris, E.D., 1911: 9; Hatch, 1953: 38; Horn, W., 1903a: 190, 1915: 376, 1926: 272, 1930: 81, and 1938: 49, (pl. 74, fig. 4); Larochelle, 1977c: 73; Leffler, 1979a: 367, and 1987: 5; Leffler and Pearson, 1976: 43; Leng, 1902a: 133, and 1920: 41; Maser and Beer, 1984: 45, 48, (fig. 14); Pearson et al., 1997: 36; Rivalier, 1954: 254; Schilder, 1953b: 563; Shook, 1984: 159; Smyth, 1933: 197; Varas Arangua, 1929a: 246; Werner, K., 1993: 67, (pl. 18, fig. 148); Wickham, 1906b: 47; Wiesner, 1992: 129; Willis, 1968: 315, 317.

BIOLOGY: Andrews, F.G., 1975: 39; LaRivers, 1946: 136; Larochelle, 1986a: 12.

HABITAT: Occurs 9,000 to 10,000 ft. on rocky hillsides in vicinity of snow pools (Cazier, 1936: 124).

pugetana Casey, 1914a: 20 (as species). British Columbia; BC WA OR.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

nigerrimoides Hatch, 1938: 233 (as aberration of variety *pugetana* Casey). WA: Buena.

IMMATURE STAGES: Leffler, 1979a: 78; Valenti, 1996b: 48.

TAXONOMY: Blackwelder, 1939: 7; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Gibson, 1915: 123; Harris, E.D. and Leng, 1916: 4; Hatch, 1938: 232, 233, (fig. 4), and 1953: 38, (pl. III, figs. 4, 5); Horn, W., 1915: 444, 1926: 265, 1930: 80, and 1938: 48, (pl. 72, fig. 29); Larochelle, 1989b: 45; Leffler, 1979a: 370; Leffler and Pearson, 1976: 43; Leng, 1920: 40; Nicolay and Weiss, 1932: 352; Pearson et al., 1997: 36; Rivalier, 1954: 253; Schilder, 1953b: 562; Smyth, 1933: 197; Varas Arangua, 1929a: 245; Wallis, 1961: 45, 70, (pl. 2, fig. 33); Werner, K., 1993: 66, (pl. 18, figs. 146, 147); Wiesner, 1992: 129; Willis, 1968: 317.

HABITAT: Appears endemic to sagebrush tracts in Columbia Basin of Washington, north to the Okanagan of British Columbia (Leffler and Pearson, 1976: 49).

pulchra dorothea Rumpp, 1977: 172, fig. 1b (as subspecies of *C. pulchra* Say). AZ: 5.2-6.2 km SE. of Willcox; AZ NM TX.

TYPE DEPOSITORY: CASC (type no. 12529).
SEX OF TYPE: M.
IMMATURE STAGES: Knisley *1987: 1191*; *Knisley and Pearson, 1984: 465, 508, (figs. 1-9, 38-43)*; Knisley et al., 1989: 179.
TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1983: 8, 21, (fig. 21); Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Hutchings, 1986: 3; Johnson, W.N., 1978a: 29; Rumpp, 1977: 172, (fig. 1); Werner, K., 1993: 69, (pl. 20, fig. 162).
BIOLOGY: Johnson, W.N., 1978a: 29; Pearson and Juliano, 1991: 224; Shelly and Pearson, 1978: 791.
HABITAT: Open flat lands covered with clumps of grass away from water (Rumpp, 1977: 177).

pulchra pulchra Say, 1823: 142 (as species). Missouri Territory; bordering the Platte and Arkansa Rivers near the mountains; WY CO/ NE KS/ AZ NM TX OK.
IMMATURE STAGES: Drew and Van Cleave, 1961: 106, 112; Hamilton, C.C., 1925: 19, 51, (figs. 76, 113, 144); Knisley and Juliano, 1988: 1983; Valenti, 1996b: 47, 49.
TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1938: 8, 20, (fig. 20); Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Bruner, 1901: 98; Cresson, 1861: 16; Dejean, 1837: 3; Drew and Van Cleave, 1961: 104, 112; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 95; Gemminger and Harold, 1868: 24; Gistl, 1837: 29; Harris, E.D., 1911: 23; Harris, E.D. and Leng, 1916: 7; Horn, W., 1903a: 182, 197, 1915: 378, 1926: 275, 1930: 82, and 1938: 49, (pl. 75, figs. 10, 11); Johnson, W.N., 1978a: 28, and 1978b: 42; Kippenhan, 1990a: 311, and 1994: 24, 49, (fig. 36); Knaus, 1900a: 111, and 1901: 110; LeConte, 1848: 175, and 1860: 34, (fig. 6); Leng, 1920: 41; Papp, H., 1952: 517; Pearson et al., 1997: 36; Popenoe, 1877: 22; Rivalier, 1954: 253; Schaupp, 1884a: 80, 88, (pl. 1, fig. 21); Schilder, 1953b: 562; Snow, 1878b: 63, and 1903: 192; Townsend, 1895: 39; Werner, K., 1993: 69, (pl. 20, fig. 161); Wiesner, 1992: 131; Willis, 1968: 317, and 1970: 5, (fig. 15).
REDESCRIPTION: Leng, 1902a: 115, 126.
BIOLOGY: Acorn, 1988: 29; Johnson, W.N., 1975b: 34, and 1977: 18; Knisley, 1984: 93; Kritsky and Simon, 1995: 146; Lantz, 1905: 255; Larochelle, 1974c: 29, and 1987a: 28-32; Lavigne, 1972: 1; Meserve, 1936: 272; Pearson, 1985: 70, and 1988: 137; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 251; Pearson and Mury Meyer, 1979: 560; Pearson and Stemberger, 1980: 374; Pearson et al., 1988: 412; Riley, 1877: 98; Rogers, L., 1974: 73; Shelly and Pearson, 1978: 791; Smyth, 1905: 428, and 1908: 188; Wickham, 1899d: 213, and 1900: 82.
HABITAT: Bare spots of loam on high ground, most often along unused roads (Wickham, 1899d: 213).

purpurea audubonii LeConte, 1845: 201 (as species). Bank of Yellowstone R. beside Fort Union; BC WA OR ID/ AB SK MB MT ND SD/ CA NV/ WY UT CO/ NE KS IA/ AZ NM TX OK.
TYPE DEPOSITORY: MCZC.

graminea Schaupp, 1884a: 89, pl. 2, fig. 38 (as variety of *C. purpurea* Olivier). KS/ CA.

auguralis Casey, 1913: 21 (as subspecies of *C. purpurea* Olivier). CO.
TYPE DEPOSITORY: USNM (type no. 45929).
SEX OF TYPE: FM.

inducta Casey, 1913: 22 (as subspecies of *C. purpurea* Olivier). CO.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

nigerrima Leng, 1918: 139 (as variety of *C. purpurea* Olivier). CO: Golden, Chimney Gulch.
TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.

IMMATURE STAGES: Drew and Van Cleave, 1961: 105; Hamilton, C.C., 1925: 18, 27, (figs. 60, 97, 127); Leffler, 1979a: 77, (fig. 5C); Valenti, 1996b: 47, 48.
TAXONOMY: Bertholf, 1983: 7, 23, (fig. 24); Blackwelder, 1939: 7; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 7, 8; Browning, 1900: 582; Bruner, 1901: 98; Cresson, 1861: 16; Dahl, 1941: 170; Dawson and W. Horn, 1928: 8; Downie and Arnett, 1996: 80, 82; Drew and Van Cleave, 1961: 104, 113; Dunn, G.W., 1891: 153; Eckhoff, 1939: 207, 209, 210; Evans, J.E., 1903: 240, and 1906: 96; Fall and Cockerell, 1907: 155; Ferris, 1969: 11; Fletcher, J., 1905: 56; Fletcher, J. and Gibson, 1908: 107, and 1909: 99; Fleutiaux, 1892: 98, 99; Frost, C.A., 1907: 64, and 1932: 245; Gardiner, 1879: 211; Gemminger and Harold, 1868: 24; Gibson, 1912: 89; Graves and Pearson, 1973: 170; Harris, E.D., 1911: 5, and 1913a: 67; Harris, E.D. and Leng, 1916: 4; Hatch, 1938: 232, (figs. 3-5), and 1953: 37, (pl. III, fig. 3); Hilchie, 1985: 323, 328, (fig. 27); Hooper, 1969: 3; Horn, W., 1903a: 193, 1915: 373, 1926: 264, 265, 1928: 9, 1930: 80, and 1938: 48, (pl. 72, fig. 25); Huber, 1986: 54; Kippenhan, 1990a: 310, and 1994: 41, (fig. 30); Knaus, 1900a: 112, and 1900b: 110; Knowlton and Wood, 1946: 91;

Lantz, 1905: 255, 256; LaRivers, 1946: 135; Larochelle, 1977c: 66-73, 1986c: 45, 1987a: 24-31, 1987b: 55, and 1989b: 44; Larson, P.R., 1981: 52; LeConte, 1845: 207, 1848: 176, and 1860: 37, (fig. 14); Leffler, 1979a: 351; Leffler and Pearson, 1976: 43; Leng, 1902a: 131, 132, *1918: 139*, and *1920: 40*; Maser and Beer, *1984: 45, (fig. 11)*; Nicolay, *1916b: 18*, and 1934: 129; Nicolay and Weiss, 1932: 346; Popenoe, 1877: 22; Rivalier, 1954: 253; Schaeffer, 1908: 53; Schaupp, 1884a: 80, 89, (pl. 2, figs. 38, 39); Schilder, 1953b: 562; Shelford, 1917: 1; Shook, 1984: 159; Smyth, 1933: 197, and 1935: 14; Snow, 1877b: 16, 1878b: 63, and 1903: 192; Stevenson, 1904a: 73; Sumlin, 1976a: 102; Summers, 1873: 132; Tanner, V.M., 1927: 10, (figs. 190, 191, 215, 222), 1929: 78, 79, and 1951: 49; Varas Arangua, 1929a: 236; Venables, 1913: 267; Wallis, 1961: 43, 45, (pl. 2, figs. 28-32); Werner, K., 1993: 66, (pl. 17, fig. 142); Wickham, 1911: 5; Wiesner, 1992: 129; Willis, 1968: 315, 316, and 1970: 5; Wright and Coolidge, 1908: 66.

REDESCRIPTION: Leng, 1902a: 132.

BIOLOGY: Acorn, 1994: 11; Blanchard, 1921: 397; Cress and Lawson, 1971: 308; Hilchie, 1985: 328; Jones, 1884: 75; Kippenhan, 1991: 11, (figs. 3-7); Kippenhan and Carter, 1993: 50; Knisley, 1984: 93; Larochelle, 1975a: 4, and 1985: 68; Lavigne, 1972: 2-4; Lawton, 1972b: 38, 39; Leng, 1902a: 133; Meserve, 1936: 271; Rogers, L., 1974: 73; Shook, 1979: 12; Smyth, 1905: 428-429, and 1908: 180-183; Wallis, 1913: 135; Wickham, 1899d: 215; Willis and Stamatov, 1971: 48.

HABITAT: Grassy prairies in light clay loam soil where some sand is present (Wickham, 1899d: 215); open level ground along roads and paths, bare spots in prairies, clay banks and gullies, clay bottoms near chalk washes, clay and red sandy roads, railroad embankments and cuts (Willis, 1970: 5).

purpurea cimarrona LeConte, 1868: 49 (as species). NM: south of Raton Mountain; UT CO/ AZ NM.

TYPE DEPOSITORY: MCZC.

ardelio Casey, 1913: 21 (as subspecies of *C. purpurea* Olivier). NM.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

TAXONOMY: Acciavatti et al., 1979: 30; Bertholf, 1983: 7, 22, (fig. 23); Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Engelhardt, 1918: 230; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 99; Harris, E.D., 1911: 6; Harris, E.D. and Leng, 1916: 5; Horn, W., 1902b: 390, 1903a: 192, 1915: 374, 1926: 266, 267, 1930: 80, and 1938: 48, (pl. 72, fig. 26); Kippenhan, 1990a: 310, and 1994: 41, 43, (fig. 31); Knaus, 1904: 153; Lantz, 1905: 254, 256; Larochelle, 1977c: 70, and 1986c: 38; Lawton, 1972b: 36; Leng, 1902a: 128, 134, (pl. III), and 1920: 40; Nicolay, 1934: 129; Nicolay and Weiss, 1932: 350, 353; Papp, H., 1952: 516; Rivalier, 1954: 253; Schaupp, 1884a: 80, 89, (pl. 2, fig. 40); Schilder, 1953b: 562; Shelford, 1917: 1; Smyth, 1933: 197, and 1935: 14; Snow, 1877b: 16; Tanner, V.M., 1927: 10, (figs. 192, 211), and 1929: 79; Wallis, 1961: 14, 39, 69, (pl. 2, fig. 37); Werner, K., 1993: 66, (pl. 17, fig. 143); Wiesner, 1992: 129; Willis, 1968: 316.

BIOLOGY: Johnson, W.N., 1977: 18; Lawton, 1972b: 39; Lawton and Willis, 1974: 54, 55; Wickham, 1899d: 216.

HABITAT: Bare clay soils about open prairies (Wickham, 1899d: 216).

purpurea hatchi Leffler, 1980: 128 (replacement name for *C. mirabilis* Casey, 1914b: 358). CA: Placer Co., Dutch Flat; WA/ OR/ CA.

mirabilis Casey, 1914b: 358 (as species; preoccupied Castelnau, 1835: 140). CA: Placer Co., Dutch Flat. Two cotypes are deposited in MCZC.

TYPE DEPOSITORY: USNM (type no. 45936).

SEX OF TYPE: F.

TAXONOMY: Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Horn, W., 1915: 444, and 1926: 265; Huber, 1969a: 21, and 1986: 54; Larochelle, 1989a: 21; Leffler, 1979a: 359, 1980: 128, and 1987: 4; Leffler and Pearson, 1976: 43; Leng, 1918: 140, and 1920: 40; Nicolay and Weiss, 1932: 346; Schilder, 1953b: 562; Smyth, 1935: 14; Werner, K., 1993: 66, (pl. 17, fig. 145); Wiesner, 1992: 129; Willis, 1968: 315.

BIOLOGY: Leffler and Pearson, 1976: 43.

HABITAT: Open places in mixed pine and chaparral in California, and the unique Mima Prairies of Thurston and Pierce Counties, Washington (Leffler and Pearson, 1976: 43, 49).

purpurea lauta Casey, 1897: 296 (as species). CA: Siskiyou Co.; OR/ CA.

franciscana Casey, 1913: 23 (as subspecies of *C. lauta* Casey). CA (locality unrecorded).

TYPE DEPOSITORY: USNM (type no. 45734).
SEX OF TYPE: M.

TAXONOMY: Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 8; Harris, E.D., 1911: 5; Harris, E.D. and Leng, 1916: 4; Hatch, 1953: 37; Horn, W., 1903a: 193, 1915: 373, 1926: 265, 1930: 80, and 1938: 48, (pl. 72, fig. 15); Knowlton and Wood, 1946: 91; Larochelle, 1977c: 73; Leffler, 1979a: 357, 1980: 128, and 1987: 4; Leffler and Pearson, 1976: 47; Leng, 1902a: 131, 133, (pl. III), 1918: 140, and 1920: 40; Maser and Beer, 1984: 45, (fig. 11); Nicolay and Weiss, 1932: 346; Rivalier, 1954: 253; Schilder, 1953b: 562; Smyth, 1935: 16; Werner, K., 1993: 66, (pl. 17, fig. 144); Wiesner, 1992: 129; Wright and Coolidge, 1908: 66.

purpurea purpurea Olivier, 1790: 14 (as species). North America, GA; SD/ MN WI MI ON PQ/ NE IA MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ ME NH VT MA RI CT/ AR MS AL TN GA SC NC.

marginalis Fabricius, 1801: 240 (as species). Canada.

ramosa Gistl, 1837: 31 (preoccupied Brullé, 1837: 7). PA.

IMMATURE STAGES: Mury Meyer, 1983: iii; Pearson, 1988: 136; Shelford, 1908: 160; Wilson, D.A., 1974: 79.

TAXONOMY: Acciavatti et al., 1992: 54, 60, (fig. 5); Andrews, W.V., 1872: 140; Beaulieu, 1900: 139; Bethune, 1873: 66; Blackwelder, 1939: 7; Blatchley, 1910: 31, 33, (figs. 13, 17); Boerner, 1894: 175; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 59; Bowditch, 1896: 2; Boyd, 1973: 4, and 1978: 199, 209, (fig. 8); Boyd et al., 1982: 7; Caron, 1951: 180, 182; Chagnon and Robert, 1962: 80, 374; Ciegler, 1997: 184, 189, (fig. 10); Cresson, 1861: 16; Davis, C.A., 1903: 271; Davis, W.T., 1915d: 156, 1916b: 154, 1918e: 39, 1919c: 75, and 1919d: 246; Dejean, 1821: 1, and 1825: 55; Dillon and Dillon, 1961: 51, 54, (pl. V, fig. 1); Dow, 1911: 272; Downie and Arnett, 1996: 80, 82, (fig. 3.9); Dunn, G.A., 1981a: 7, (fig. 13), and 1986b: 28; Easton, 1909: 36; Eckhoff, 1939: 207, 224; Edwards, J.G., 1949: 73; Ehrmann, 1897: 169; Emmons, 1854: 35; Fisco, 1938: 38; Fleutiaux, 1892: 97, 98; Fyles, 1891: 17; Garneau, 1979: 15; Gemminger and Harold, 1868: 24; Gistl, 1837: 31; Glaser, 1984: 66, 71; Gould, 1834: 44; Goulet, 1983: 16, 21, (fig. 2); Graves, 1963: 496, 504, (fig. 15), and 1965: 67; Graves and Brzoska, 1991: 4, 6, 14, (fig. 18); Graves and Pearson, 1973: 159, 164, 170, (fig. 8); Greene, 1914b: 237; Hamilton, J., 1889b: 104; Hanham, 1894: 350; Harrington, 1882a: 7, 1882b: 28, and 1890: 138; Harris, E.D., 1905a: 100, 1911: 4, and 1918b: 237; Harris, E.D. and Leng, 1916: 4; Harris, T.W., 1852: 1, (fig. M); Hatch, 1953: 37; Hilchie, 1985: 323, 328, (fig. 27); Hood, L.E., 1903: 115; Horn, G.H., 1876c: 127; Horn, W., 1903a: 192, 1915: 372, 373, 1926: 264, 1928: 9, 1930: 79, and 1938: 48, (pl. 72, fig. 14); Houghton, 1908: 400; Johnson, H.L., 1915: 308; Jules, 1937: 2, 4, (fig. 9); Kirby, 1837: 11; Kirk, 1970: 7; Kirk and Balsbaugh, 1975: 12; Knisley and Schultz, 1997: 93, 121, (photo. 20); Knisley et al., 1987a: 281, 283, (fig. 20); Kwiat, 1905: 125; Larochelle, 1972b: 56, 1974g: 87, 1975b: 25, 76, 1976a: 78, (fig. 396), 1976b: 75, 78, (fig. 19), 1977c: 66-72, 1979: 14, 1980a: 37, 1980b: 40, 41, 1986c: 36-48, 1986d: 61, 1987a: 21-32, 1987b: 52-59, and 1989b: 41-47; LeConte, 1848: 176, and 1860: 37, (fig. 14); Leffler and Pearson, 1976: 41; Leng, 1902a: 115, 128, 130, (pl. II, III), 1912a: 12, and 1920: 40; Leng and Beutenmüller, 1893: 92, and 1894b: 89, 91, (fig. 11); Macgillivray and Houghton, 1902: 249; Mather, 1971: 22; Montgomery and Montgomery, 1931: 357; Nicolay, 1916a: 98, and 1934: 128; Nicolay and Weiss, 1932: 345; Notman, 1920b: 178; Olivier, 1791: 724, 729; Pearson, 1988: 136; Pearson et al., 1997: 36; Pettit, 1869: 106; Provancher, 1870: 221; Rivalier, 1954: 253; Rogers, R.V., 1880: 63, (fig. 11), and 1881: 24; Say, 1818: 419; Schaupp, 1884a: 80, 89, (pl. 2, fig. 37); Schilder, 1953a: 314, and 1953b: 562; Shelford, 1917: 1; Sherman, F., 1904: 29; Shoemaker and W.T. Davis, 1915: 157; Skinner, 1909: 185; Slosson, 1895b: 279, and 1895c: 318; Smith, J.B., 1909: 197; Smyth, 1933: 197, and 1935: 14; Summers, 1873: 132; Valenti, 1986a: 3; Wallis, 1961: 14, 43, 70, (pl. 2, fig. 27); Ward and Bowling, 1980: 31; Weeks, 1914: 27; Werner, K., 1993: 66, (pl. 17, fig. 141); Wickham, 1894: 151, (fig. 13); Wiesner, 1992: 128; Williams, J., 1879: 39; Willis, 1968: 315, 316; Wilson, D.A. and Brower, 1983: 10, 29, (fig. 8).

REDESCRIPTION: Leng, 1902a: 130, (pl. II, III).

BIOLOGY: Acciavatti et al., 1992: 60; Bethune, 1910: 228; Blanchard, 1921: 397; Blatchley, 1910: 33; Boyd, 1978: 209; Cartwright, 1935: 70; Cooper, 1992: 6; Cutler, 1969a: 5, and 1969b: 14; Dunn, G.A., 1981a: 7; Fox, H., 1910: 82; Freitag and Tropea, 1969: 16; Goldsmith, 1916: 447, 450, and 1919: 437, 444; Graves, 1963: 504; Graves and Brzoska, 1991: 14; Graves and Pearson, 1973: 170; Harris, T.W., 1891: 170; Hilchie, 1985: 328; King, I.N., 1914: 319; Knisley and Schultz, 1997: 93, 121, (photo. 20); Knisley et al., 1987a: 281; Kritsky and Simon, 1995: 146; Larochelle, 1974c: 29; Lawton, 1971b: 61, 62; Leng, 1902d: 238; Liebeck, 1890: 159; Meserve, 1936: 271; Moffat, 1877: 100; Moore, R.M., 1906: 338; Niemelä and Ranta, 1993: 87; Pearson, 1988: 136; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 412; Serrano and Yadov, 1984: 337; Shelford, 1917: 1; Sherman, F., 1908: 363; Smith, S.G., 1953: 33; Smith, S.G. and Edgar, 1954: 657; Smyth, 1905: 426, and 1908: 180-183; Snyder, W.E., 1931: 141; Vaurie, 1950b: 151; Wickham, 1899d: 215; Wilson, D.A., 1978: 14; Wilson, D.A. and Brower, 1983: 10; Yadav et al., 1985: 5.

HABITAT: Grassy places by roads, paths by meadows (Boyd, 1978: 209; Wickham, 1899d: 215).

repanda novascotiae Vaurie, 1951: 1, fig. 1A (as subspecies of *C. repanda* Dejean). NS: Truro; PQ/ NB PE NS. A female allotype is deposited in AMNH, and eleven paratypes (no. 5879) are in CNCI (de Ruette, 1970: 30).

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 59; Boyd et al., 1982: 6; Freitag, 1972a: 21; Kippenhan, 1995b: 55; Larochelle, 1975b: 25, 77, 1976a: 77, (fig. 389), 1976b: 74, 78, (fig. 12), 1980a: 37, and 1987a: 29; Lindroth, 1954a: 299; Schilder, 1953b: 560; Wallis, 1961: 16, 18, 69, (pl. 3, figs. 47, 48); Werner, K., 1993: 61, (pl. 13, fig. 104); Wiesner, 1992: 120; Willis, 1968: 313, (fig. 25); Wilson, D.A., 1970: 18.

HABITAT: Red sand and clay, ocean beaches, wet roadside ditches, sheltered sides of sand dunes, sandy areas beside lakes (Freitag, 1972a: 21; Freitag and Tropea, 1969: 14, 15).

repanda repanda Dejean, 1825: 74 (as species). North America; NT/ BC WA OR ID/ AB SK MB MT ND SD/ MN WI MI ON PQ/ NB PE NS NF/ WY UT CO/ NE KS IA MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ ME NH VT MA RI CT/ AZ NM TX OK/ AR LA MS AL TN GA SC NC FL.

baltimorensis Herbst, 1806: 181 (as species; nomen dubium). Baltimore.

unijuncta Casey, 1897: 299 (as subspecies of *C. repanda* Dejean). TX: El Paso.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

hoosieri Mares, 1921: 310 (as variety of *C. repanda* Dejean). IN: Lake Co., Cedar Lake.

TYPE DEPOSITORY: INHS.

SEX OF TYPE: F.

duncani Knaus, 1924a: 126 (as color form of *C. unijuncta repanda* Casey). AZ: near Phoenix.

maehleri Robinson, 1948: 27 (as variety of *repanda* Dejean). TX: Brazos Co.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

IMMATURE STAGES: Bram and Knisley, 1982: 99; Drew and Van Cleave, 1961: 105, 114; Gilbert, 1986: 1; Hamilton, C.C., 1925: 18, 31, (figs. 63, 100, 130); Horn, G.H., 1878: 35; Larochelle, 1987b: 58; Leffler, 1979a: 71, (fig. 5A); Palmer, 1978a: 49, 1978b: 371, 1979: 3, 9, and 1982: 61; Palmer and Gorrick, 1979: 17; Schaupp, 1879a: 1, 1879b: 23, 1882: 18, (pl. 1, figs. 4a, b), and 1884b: 123, (fig. 124); Shelford, 1907: 12, and 1908: 166; Valenti, 1996b: 46-48; Wilson, D.A., 1974: 79.

TAXONOMY: Acciavatti et al., 1979: 30, and 1992: 54, 57, (fig. 3); Akerlund, 1907: 88; Andrews, W.V., 1872: 140; Arnett, 1993: 286; Beaulieu, 1900: 140; Bertholf, 1983: 7, 23, (fig. 25); Bethune, 1870: 77; Blatchley, 1910: 31, 34, (fig. 20); Boerner, 1894: 175; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 59; Bowditch, 1900: 393; Boyd, 1973: 4, and 1978: 199, 203, (fig. 3); Boyd et al., 1982: 6; Brown, 1930b: 146; Bruner, 1901: 93; Caron, 1951: 180, 183; Casey, 1913: 28; Chagnon and Robert, 1962: 80, (fig. 5c), 375; Choate, 1975: 72; Ciegler, 1997: 184,

189, (fig. 9); Cresson, 1861: 10; Criddle, 1921: 72; Davis, C.A., 1903: 272; Davis, W.T., 1895: 140, 1912a: 18, 1915a: 71, 1915c: 154, 1915d: 156, 1916b: 154, 1919a: 25, 1919c: 75, 1919d: 246, and 1930: 78; Dawson and W. Horn, 1928: 8; Dejean, 1826: 414, and 1837: 3; Dillon and Dillon, 1961: 51, 54, (pl. 5, fig. 4); Downie and Arnett, 1996: 80, 81, (fig. 3.5); Drew and Van Cleave, 1961: 104, 113, (fig. 16); Dunn, G.A., 1981a: 7, (fig. 14), and 1986b: 28; D'urban and Bell, 1860: 10; Easton, 1909: 36; Eckhoff, 1939: 207, 214; Edwards, J.G., 1949: 73; Ehrmann, 1897: 169; Emmons, 1854: 35; Evans, J.E., 1903: 240; Fall, 1895: 179; Fall and Cockerell, 1907: 155; Fattig, 1935: 154; Fleutiaux, 1892: 91; Foster and Knowles, 1990: 838; Freitag, 1965: 87, 101, 102, (figs. 4, 10), and 1972b: 1279, (figs. 1-4, 41-48); Gardiner, 1879: 211; Garneau, 1979: 15; Gaumer and Murray, 1971: 9; Gaumer et al., 1970: 6; Gemminger and Harold, 1868: 25; Gibson, 1919: 97; Glaser, 1984: 66, 69; Gould, 1871: 49; Goulet, 1983: 17, 22, (fig. 12); Graves, 1962: 1231, 1963: 496, 504, (fig. 7), 1965: 64, and 1969: 86; Graves and Brzoska, 1991: 4, 6, 12, (fig. 16); Graves and Pearson, 1973: 159, 163, 168, (fig. 5); Green, 1918: 120; Hanham, 1885: 41, and 1894: 350; Harrington, 1890: 138; Harris, E.D., 1901b: 27, 1902: 217, 1905a: 100, 1911: 9, 1912b: 142, 1912c: 212, 1916a: 101, and 1918b: 237; Harris, E.D. and Leng, 1916: 5; Harris, T.W., 1852: 1, (fig. B); Hatch, 1924: 547, 1938: 233, (figs. 7, 7-a), and 1953: 39, (pl. III, figs. 7, 7a); Hicks, 1955: 12; Hilchie, 1985: 323, 324, (fig. 14); Hood, L.E., 1903: 115; Hooper, 1969: 1; Horn, G.H., 1876c: 127; Horn, W., 1902a: 234, 1902b: 385, 1915: 32, (fig. 91), 374-375, 1926: 268, 269, 1928: 10, 1930: 81, and 1938: 48, (pl. 73, fig. 6); Houghton, 1908: 400; Huber, 1986: 54; Hutchings, 1986: 3, 4; Johnson, H.L., 1915: 308; Jules, 1937: 2, 4, (fig. 7); King, B.L., 1988: 45; Kippenhan, 1990a: 309, and 1994: 24, 28, (figs. 5, 20); Kirby, 1837: 9; Kirk, 1969: 7, and 1970: 7; Kirk and Balsbaugh, 1975: 12; Knaus, 1893: 293, 1895: 284, 1915a: 35, and 1916: 79; Knisley and Schultz, 1997: 93, 122, (photo. 21); Knisley et al., 1987a: 281, 283, (fig. 11C); Kritsky et al., 1996: 29; Landry, L.P., 1979a: 44, and 1979c: 46; Lantz, 1905: 258; Larochelle, 1971b: 5, 1972b: 49, 1973d: 139, 1974g: 87, 1975b: 25, 75, 1976a: 77, (fig. 388), 1976b: 74, 78, (fig. 11), 1977c: 65-73, 1979a: 14, 1979d: 14, 1979h: 76, 1980a: 37, 1980b: 41, 42, 1986c: 34-48, 1986d: 61, 1987a: 21-32, 1987b: 52-57, 1989a: 20, 24, and 1989b: 41-46; Larson, P.R., 1981: 52; Lawton, 1970b: 1, 6; LeConte, 1848: 180, 1860: 43, (fig. 25), and 1866: 362; Leffler, 1979a: 267; Leffler and Pearson, 1976: 35; Leng, 1902a: 116, 146-148, (pl. II, III), 1902b: 131, 1910a: 73, 1912: 4, 6, 13, 1915: 563, 1917b: 243, 1918: 140, and 1920: 40; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 93, (fig. 16); Leng and Mutchler, 1927: 7; Liard, 1979a: 16; Lindroth, 1955: 17; Loding, 1910: 131; Macgillivray and Houghton, 1902: 249; Maser and Beer, 1984: 42, (fig. 9); Mather, 1971: 21; Montgomery and Montgomery, 1931: 358; Morgan, A.V. and A. Morgan, 1980: 1107; Nagano et al., 1982: 342; Notman, 1920b: 178; Pearson et al., 1997: 36; Pettit, 1869: 106; Popenoe, 1877: 22; Provancher, 1870: 222; Rivalier, 1954: 252, (fig. 1b); Schaupp, 1878f: 56, and 1884a: 81, 94, (pl. 3, fig. 62; pl. 5, fig. 132); Schilder, 1953b: 560; Shelford, 1917: 1; Sherman, F., 1904: 29; Shoemaker and W.T. Davis, 1915: 157; Shook, 1984: 159; Skinner, 1909: 185; Smith, D.G., 1988: 35; Smith, J.B., 1909: 197; Snow, 1903: 192; Stark, 1984: 138; Summers, 1873: 132; Tanner, V.M., 1929: 79; Townsend, 1884c: 219, and 1885: 67; Valenti, 1986a: 4; Vogler and Pearson, 1996: 324; Wallis, 1961: 16, 18, 69, (pl. 2, figs. 45, 46); Weed, 1892: 278; Werner, K., 1993: 61, (pl. 13, fig. 102); Wickham, 1894: 152, 1899a: 6, 1899b: 121, and 1911: 5; Wiesner, 1992: 119, 120; Willis, 1967: 238, 1968: 313, (fig. 25), and 1970: 5, (fig. 18); Wilson, D.A. and Brower, 1983: 8, 28, (fig. 6); Wolcott, 1895: 309.

REDESCRIPTION: Leng, 1902a: 147, (pl. II, III).

BIOLOGY: Acciavatti et al., 1992: 57; Acorn, 1994: 11; Blanchard, 1921: 397; Blatchley, 1910: 34; Boyd, 1978: 203; Cartwright, 1935: 71; Criddle, 1907: 111, and 1915: 27; Cutler, 1969b: 14; Davis, W.T., 1919a: 25; Drew and Van Cleave, 1961: 114; Erwin, 1981: 124, 138; Fox, H., 1910: 81; Freitag, 1972a: 21, 22; Freitag and Tropea, 1969: 15-17, and 1971: 53-56; Frost, C.A., 1929: 219; Gilbert, 1986: 1, 51, and 1997: 217; Glaser, 1976: 17, and 1984: 69; Goldsmith, 1916: 447-454, and 1919: 437, 444; Graves, 1963: 504, 1965: 64, and 1969: 86; Graves and Brzoska, 1991: 12; Graves and Pearson, 1973: 168; Hamilton, J., 1885a: 36, 1885b: 201, 1890: 142, and 1893: 272, 324; Hatch, 1925: 217; Higley, 1986: 303; Hilchie, 1985: 324; Hill and Knisley, 1992: 306; Johnson, W.N., 1975a: 21, 1975b: 34, 1977: 19, and 1978a: 30; Jones, 1884: 75; King, I.N., 1914: 319; Knaus, 1894: 126, and 1900a: 113; Knisley, 1979: 211, and 1984: 93; Knisley and Hill, 1992: 133; Knisley and Schultz, 1997: 93, 122, (photo. 21); Knisley et al., 1987a: 281; Kritsky and Reidel, 1996: 53; Kritsky and Simon, 1995: 146; Kuster, 1979: 297; Landry, J.F., 1978: 14; Larochelle, 1972a: 8, 1973a: 32, 1973c: 6, 1974b: 18, 1974c: 30, 1974f: 84, 1974h: 99, 100, 1975a: 3, 4, 1977b: 55, 1978c: 23, 25, 1987b: 53-57, and 1989a: 19, 20; Lawton, 1971b: 61, 62, 66, and 1972b: 37, 39; Lawton and Willis, 1974: 49, 50, 63, 64; Leffler, 1975: 28; Leng, 1902b: 134, 135, 1902d: 238, and 1906: 56; Liebeck, 1890: 159;

Lindroth, 1963: 12, 22; May et al., 1986: 171; Meserve, 1936: 271; Moore, R.M., 1905: 203, and 1906: 338; Nelson and LaBonte, 1989: 49-51; Palmer, 1978a: 49, 1978b: 371, 1981: 35, and 1982: 61; Payne, 1971: 129; Pearson, 1988: 130, 131, 138; Pearson et al., 1988: 412; Robinson, 1975: 36; Rogers, L., 1974: 73; Roy, 1899: 87; Schaupp, 1878e: 35; Schultz and Rankin, 1985a: 87; Serrano and Yadov, 1984: 337; Shelford, 1911: 584, 1915b: 244, (figs. 8, 13), and 1917: 1; Sherman, F., 1908: 360; Shook, 1981: 359; Smith, D.G., 1976: 15, 1981: 43, and 1988: 35; Smith, D.G. and Gershman, 1977: 29, and 1979: 59; Smith, S.G., 1950: 60, and 1953: 33; Smith, S.G. and Edgar, 1954: 657; Smyth, 1905: 425-430, and 1908: 182-184; Spomer and Higley, 1993: 394; Valenti, 1986b: 23; Valenti and Kurczewski, 1987: 37; Van Natto and Freitag, 1986: 89; Vaurie, 1950b: 151; Vogler and Pearson, 1996: 324; Vogler et al., 1997: 6; Wickham, 1899d: 219, and 1900: 82; Will et al., 1995: 62; Willis, 1967: 145, and 1974: 2, (fig. 1); Willis and Stamatov, 1971: 49; Wilson, D.A., 1975: 45, 49, and 1978: 15; Wilson, D.A. and Brower, 1983: 8; Wilson, D.S., 1978: 128; Yadav et al., 1985: 5.

HABITAT: Moist clean sand, sparsely grassed; heavy moist soil along riverbanks, especially on mudflats and sandy bars up to a foot or so from water's edge (Wallis, 1961: 20).

repanda tanneri Knaus, 1929: 47 (as species). UT: Green River; UT.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 60; Boyd et al., 1982: 6; Horn, W., 1930: 80; Larochelle, 1985: 67; Leng and Mutchler, 1933: 9; Schilder, 1953b: 562; Tanner, V.M., 1929: 85; Werner, K., 1993: 61, (pl. 13, fig. 103); Wiesner, 1992: 120; Willis, 1967: 239, and 1968: 313, (fig. 25).

BIOLOGY: Johnson, W.N., 1975b: 34.

HABITAT: Bare mud, alkaline encrusted soils, sandy banks of the Green River (Lawton, 1972b: 40; Leffler, 1975: 30).

scutellaris flavoviridis Vaurie, 1950a: 2 (as subspecies of *C. scutellaris* Say). TX: Montague Co., Forestburg; TX. A female allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 60; Boyd et al., 1982: 9; Gaumer and Murray, 1971: 10; Robinson and Murray, 1980: 27; Schilder, 1953b: 562; Valenti, 1986a: 4; Werner, K., 1993: 71, (pl. 22, fig. 180); Wiesner, 1992: 132.

HABITAT: Dry sandy wash in open field; sandy upper beach area of the Red River (Lawton, 1971b: 61, 66).

scutellaris lecontei Haldeman, 1853: 361 (as species). WI; MB ND/ MN WI MI ON PQ/ NE KS IA MO IL IN OH/ NY NH MA?

criddlei Casey, 1913: 19 (as species). MB: Aweme.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

IMMATURE STAGES: Criddle, 1910: 14; Hamilton, C.C., 1925: 19, 48, (figs. 75, 112, 143); Palmer, 1982: 61; Shelford, 1907: 12, 1908: 166, and 1913a: 213; Smith, W.A., 1971: 80; Valenti, 1996b: 47.

TAXONOMY: Acciavatti et al., 1992: 53, 64, (fig. 9); Beaulieu, 1900: 139; Blatchley, 1910: 30, 32, (fig. 11); Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 60; Boyd et al., 1982: 9; Bruner, 1901: 98; Caron, 1951: 180, 182; Chagnon and Robert, 1962: 374; Cresson, 1861: 14; Dawson and W. Horn, 1928: 7; Dillon and Dillon, 1961: 51, 55, (pl. 6, fig. 5); Downie and Arnett, 1996: 79, 81, 82, (fig. 3.13); Dunn, G.A., 1981a: 7, (fig. 15), and 1986b: 29; Edwards, J.G., 1949: 73; Fletcher, F.C., 1929: 257; Fleutiaux, 1892: 96; Gemminger and Harold, 1868: 20; Gibson, 1914: 106; Goulet, 1983: 17, 22, (fig. 5); Graves, 1963: 496, 505, (fig. 13), and 1965: 66; Graves and Brzoska, 1991: 4, 5, 19, (fig. 23); Graves and Pearson, 1973: 159, 163, 175; Harris, E.D., 1911: 25; Harris, E.D. and Leng, 1916: 7; Hicks, 1947a: 117; Horn, W., 1903a: 187, 1915: 379, 1926: 276, 277, 1928: 12, 1930: 83, and 1938: 49, (pl. 75, figs. 17-19); Huber, 1980a: 24; Jules, 1937: 2, 4, (fig. 6); Knisley et al., 1987a: 282, 283, (fig. 23); Kwiat, 1905: 129; Landry, L.P., 1979c: 46; Larochelle, 1972b: 54, 1974a: 12, 1974g: 87, 1975b: 25, 77, 1976a: 78, (fig. 392), 1976b: 74, 78, (fig. 15), 1977c: 70, 1986c: 43, 46, 1987a: 23-30, and 1989b: 43, 45; Larson, P.R., 1981: 52; LeConte, 1860: 34, (fig. 7); Leng, 1902a: 125, (pl. III), 1902f: 252, 1918: 138, 140, and 1920: 41; Leng and Beutenmüller, 1894a: 43, and 1894b: 88, 91, (fig. 8); Liard, 1979a: 16; Moffat, 1894: 80; Montgomery and Montgomery, 1931: 358;

Pettit, 1872: 98; Popenoe, 1877: 22; Provancher, 1870: 221; Schaupp, 1884a: 79, 87, (pl. 2, fig. 27; pl. 5, fig. 127); Schilder, 1953b: 562; Shelford, 1917: 1; Valenti, 1986a: 4; Wallis, 1961: 35, 69, (pl. 4, figs. 87-90); Werner, K., 1993: 71, (pl. 21, fig. 175); Wickham, 1894: 151, and 1911: 5; Wiesner, 1992: 132; Wilson, D.A. and Brower, 1983: 14, 30, (fig. 11).

BIOLOGY: Acciavatti et al., 1992: 64; Acorn, 1992: 217, 226; Blanchard, 1921: 397; Blatchley, 1910: 32; Cooper, 1992: 1, 8; Criddle, 1907: 112, and 1915: 25; Cutler, 1969b: 14; Dunn, G.A., 1978: 2, 1981a: 7, and 1981b: 9; Freitag, 1972a: 22; Freitag and Tropea, 1969: 23, and 1971: 55; Graves, 1963: 505, and 1965: 66; Graves and Brzoska, 1991: 19; Knaus, 1900a: 111; Knisley, 1979: 213; Knisley et al., 1987a: 282; Larochelle, 1973a: 32, 1973c: 6, 1974a: 12, 1974b: 18, 1974c: 30, 1974h: 100, 1975a: 1, 3, 1985: 68, and 1989a: 20; Meserve, 1936: 272; Nelson and LaBonte, 1989: 49, (fig. 1); Pearson et al., 1988: 412; Riley, 1877: 98; Serrano and Yadov, 1984: 337; Shelford, 1911: 584, 1915b: 244, (figs. 10-12), and 1917: 1; Smith, S.G., 1953: 33; Smith, S.G. and Edgar, 1954: 662, (fig. 16); Smyth, 1905: 425; Ward and Bowling, 1980: 31; Wickham, 1899d: 213; Will et al., 1995: 62; Willis and Stamatov, 1971: 50; Wilson, D.A., 1975: 45; Wood, 1965: 392; Yadav et al., 1985: 5.

HABITAT: Dry, deep sand away from water (Wickham, 1899d: 213); sandy fields or the edges of drifting sand among sparse vegetation (Criddle, 1907: 113).

scutellaris rugata Vaurie, 1950a: 3 (as subspecies of *C. scutellaris* Say). LA: Natchitoches Co., Vowell's Mill; TX/ AR LA. A female allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 60; Boyd et al., 1982: 9; Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 159, 163, 173, 175, (fig. 11); Knaus, 1893: 294; Larochelle, 1977c: 69; Robinson and Murray, 1980: 27; Schilder, 1953b: 562; Ward, 1971: 70, (figs. 13-15); Werner, K., 1993: 71, (pl. 22, fig. 179); Weisner, 1992: 132; Valenti, 1986a: 4.

BIOLOGY: Graves and Pearson, 1973: 175; Lawton, 1971b: 61, 64, 65; Schultz, 1981: 48, 1982: 41, and 1989: 468; Schultz and Rankin, 1985a: 87, and 1985b: 111.

HABITAT: Sandy coastal plains soil system of western LA and eastern TX (Graves and Pearson, 1973: 175).

scutellaris rugifrons Dejean, 1825: 51 (as species). North America; NY PA NJ MD VA/ MA RI CT/ NC.

modesta Dejean, 1825: 52 (as species). Saint Domingue.

denticulata Harris, T.W., 1828: 90 (as species; *In* Hentz, 1830: 253). On the sands near Sweet Auburn in Cambridge.

oberleitneri Gistl, 1837: 55 (as variety of *C. denticulata* (Hentz). MA?

carolina Harris, E.D., 1911: 27, 28 (as race of *C. scutellaris rugifrons* Dejean). NC: Raleigh.

TYPE DEPOSITORY: MCZC (cotypes).

IMMATURE STAGES: Bram and Knisley, 1982: 99; Dow, 1916b: 74, (figs. 3, 8).

TAXONOMY: Angell, 1925: 191; Bousquet and Larochelle, 1993: 60; Boyd, 1973: 5, and 1978: 198, 199, 218, (fig. 12); Boyd et al., 1982: 9; Cartwright, 1935: 72; Cresson, 1861: 17, and 1912: 385; Davis, C.A., 1903: 270; Davis, W.T., 1895: 140, 1912a: 18, 1913: 42, 1914c: 267, 1915d: 156, 1916a: 101, 1918b: 125, and 1918e: 39; Dejean, 1831: 209, 210, and 1837: 3; Downie and Arnett, 1996: 79, 82; Dunn, G.A., 1986b: 29; Engelhardt, 1916: 91; Fletcher, J., 1905: 56; Fleutiaux, 1892: 95, 96; Fox, W.J., 1904: 318; Frost, C.A., 1907: 64; Gemminger and Harold, 1868: 25; Gistl, 1837: 29; Glaser, 1984: 66, 72; Gould, 1834: 46; Greene, 1914a: 89, and 1914b: 237; Haimbach, 1905: 248; Hamilton, J., 1885b: 201, and 1889a: 29; Harris, E.D., 1902: 217, 218, 1905a: 100, 1911: 26, 28, and 1916a: 101; Harris, E.D. and Leng, 1916: 7; Harris, E.D. et al., 1913: 164; Harris, T.W., 1852: 1, (fig. Q); Horn, W., 1903a: 194, 1915: 379, 380, 1926: 276- 278, 1930: 83, and 1938: 49, (pl. 75, figs. 14-16); Huber, 1969a: 20, and 1986: 55; Johnson, F.H., 1894: 142; Joutel, 1902: 248; Kirk, 1969: 7, and 1970: 7; Knisley and Schultz, 1997: 92, 93, 125, (photos. 23a, 23b); Larochelle, 1977c: 68, 1979: 15, 1980b: 41, 1986c: 33-47, 1986d: 62, 1987a: 26, 27, 1987b: 52-58, and 1989b: 43; LeConte, 1848: 175, 1860: 34, 35, (fig. 8), and 1866: 363; Leng, 1902a: 125, (pl. III), 1902f: 252, 1918: 138, 140, and 1920: 41; Leng and Beutenmüller, 1893: 92, 1894a: 43, and 1894b: 88-91, (fig. 5); Nicolay and Weiss, 1932: 342; Rivalier, 1954: 253-255, (fig. 3a); Schaeffer, 1904b: 126; Schaupp, 1881: 14, and 1884a: 79, 87, (pl. 2, figs. 26, 28); Schilder, 1953a: 315, and 1953b: 562; Sherman, F., 1904: 28; Skinner, 1909: 185; Smith, J.B., 1909: 197; Stevenson, 1904a: 74, and 1904b: 91; Valenti, 1986a: 4; Weeks, 1884: 105; Werner, K., 1993: 71, (pl. 22, fig. 177); Wiesner, 1992: 132.

BIOLOGY: Blanchard, 1921: 397; Boyd, 1978: 218; Cartwright, 1935: 72; Davis, W.T., 1906: 120; Dunn, G.A., 1978: 2; Fox, H., 1910: 82; Harris, E.D., 1906: 120; Knisley and Schultz, 1997: 92, 93, 125, (photos. 23a, 23b); Larochelle, 1987a: 27; Leng, 1902a: 126, and 1902d: 237; Liebeck, 1890: 158; May et al., 1986: 171; Pearson et al., 1988: 412; Wickham, 1899d: 212.

HABITAT: Dry, sandy, semi-open areas, trails among fine grasses, lichens and mosses (Boyd, 1978: 219).

scutellaris scutellaris Say, 1823: 140 (as species; the established junior name *scutellaris* is here retained, in place of the rare senior name *scutelaris*, for reasons of nomenclatural stability). Arkansa; AB SK MT ND SD/ WY CO/ NE KS IA/ NM TX OK.

billingsi Casey, 1924: 14 (as subspecies of *C. scutellaris* Say). MT: Billings.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

shantzi Casey, 1924: 14 (as species). CO.

TYPE DEPOSITORY: USNM (type no. 45914).

SEX OF TYPE: M.

IMMATURE STAGES: Drew and Van Cleave, 1961: 106; Schultz, 1989: 470.

TAXONOMY: Acciavatti et al., 1979: 30; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 60; Boyd, 1978: 218; Boyd et al., 1982: 9; Bruner, 1901: 98; Cresson, 1861: 18; Downie and Arnett, 1996: 79, 82; Drew and Van Cleave, 1961: 104, 115; Eckhoff, 1939: 206, 216; Fall, 1895: 179; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 95; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 25; Harris, E.D., 1911: 24; Harris, E.D. and Leng, 1916: 7; Hilchie, 1985: 324, 330, (figs. 5, 24); Hooper, 1969: 2; Horn, G.H., 1892: 27; Horn, W., 1903a: 197, 1915: 379, 1926: 276, 1930: 83, and 1938: 49, (pl. 75, fig. 13); Huber, 1986: 55; Kippenhan, 1990a: 311, and 1994: 23, 24, 53, (fig. 35); Kirk and Balsbaugh, 1975: 13; Knaus, 1894: 126, 1895: 284, 1897: 197, 1899: 37, 38, 1900a: 111, 1915a: 35, 1915b: 84, 1916: 79, 1924b: 171, and 1926: 263; Larochelle, 1977c: 70, 1986c: 42, 1987a: 22-29, and 1987b: 55, 56; Larson, P.R., 1981: 52; LeConte, 1848: 176, 1860: 35, (fig. 9), and 1875: 157; Leng, 1902a: 115, 125, (pl. II), 1912: 15, and 1920: 41; Leng and Mutchler, 1927: 7; Papp, H., 1952: 508; Pearson et al., 1997: 36; Popenoe, 1877: 22; Rivalier, 1954: 253; Rumpp, 1986: 139, 145; Schaupp, 1884a: 79, 87, (pl. 2, fig. 25); Schilder, 1953a: 315, and 1953b: 562; Snow, 1878b: 63, and 1903: 192; Wallis, 1961: 13, 14, 33, 69, (pl. 4, figs. 84-86); Werner, K., 1993: 70, (pl. 21, fig. 174); Wiesner, 1992: 132; Willis, 1968: 310, 316, and 1970: 5, (fig. 19); Willis and Stamatov, 1971: 49.

REDESCRIPTION: Leng, 1902a: 125.

BIOLOGY: Acorn, 1988: 29, (fig. 3), 1991: 17, and 1992: 217, 226; Drew and Van Cleave, 1961: 115; Hilchie, 1985: 330; Jones, 1884: 75; Kippenhan and Carter, 1993: 49; Kirk, 1969: 7, and 1970: 7; Knisley, 1984: 93; Kritsky and Simon, 1995: 146; Lantz, 1905: 254; Larochelle, 1974c: 31, and 1989a: 17; Lawton, 1971b: 61, 66, 68, and 1972b: 38, 39; Lawton and Willis, 1974: 47; Meserve, 1936: 272; Niemelä and Ranta, 1993: 87; Palmer, 1981: 35, and 1982: 61; Pearson and Juliano, 1991: 224; Pearson and Mury Meyer, 1979: 564; Pearson et al., 1988: 408, 412; Riley, 1877: 98; Rogers, L., 1974: 73; Vaurie, 1950b: 152; Wickham, 1899d: 212; Wilson, D.A. and Brower, 1983: 14.

HABITAT: Sandy blowouts; sand is loose and vegetation is very sparse (Wallis, 1961: 35).

scutellaris unicolor Dejean, 1825: 52 (as species). North America; MS AL TN GA SC FL.

TAXONOMY: Beaulieu, 1900: 153; Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 60; Boyd et al., 1982: 9; Cartwright, 1935: 72; Choate, 1975: 72; Ciegler, 1997: 184, 189, (figs. 14, 18); Cresson, 1861: 17; Dejean, 1826: 413, 1831: 210, and 1837: 3; Dillon and Dillon, 1961: 51, 55, (pl. VI, fig. 6); Dozier, 1918: 296; Drew and Van Cleave, 1961: 104, 115; Fall and Cockerell, 1907: 155; Fattig, 1935: 154; Fleutiaux, 1892: 96; Gemminger and Harold, 1868: 25; Gistl, 1837: 29; Graves and Pearson, 1973: 159, 163, 173, 174; Harris, E.D., 1911: 26, and 1912b: 142; Harris, E.D. and Leng, 1916: 7; Harris, T.W., 1852: 1; Horn, W., 1915: 379, 1926: 277, and 1930: 83; Johnson, F.H., 1894: 142; Kirk, 1969: 7, and 1970: 7; Knisley and Schultz, 1997: 92, 93, 125, (photo. 23c); Larochelle, 1977c: 66, 1986c: 39-48, and 1987a: 27; LeConte, 1848: 175, and 1860: 35, (fig. 8); Leng, 1902a: 125, 1902b: 131, 1906: 56, 1915: 560, and 1920: 41; Löding, 1910: 131; Mather, 1971: 22; Nicolay and Weiss, 1932: 343; Rivalier, 1954: 254; Schaupp, 1884a: 79, 87, (pl. 2, figs. 30, 31); Schilder, 1953b: 562; Sherman, F., 1904: 28; Slosson, 1893: 147; Valenti, 1986a: 4; Werner, K., 1993: 71, (pl. 22, fig. 178); Wickham, 1894: 153.

BIOLOGY: Cartwright, 1935: 72; Kirk, 1969: 7, and 1970: 7; Knisley and Schultz, 1997: 92, 93, 125, (photo. 23c); Leng, 1902b: 132; Vogt, 1949: 2; Wickham, 1899d: 212.
HABITAT: Sandy paths and roads; dry runs (Wickham, 1899d: 212).

scutellaris yampae Rumpp, 1986: 140, fig. 1 (1) (as subspecies of *C. scutellaris* Say). CO: Moffat Co., Maybell Sand Hills; CO.
TYPE DEPOSITORY: AMNH.
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 60; Kippenhan, 1990a: 311, and 1994: 53, (fig. 34); Werner, K., 1993: 71, (pl. 22, fig. 181).
BIOLOGY: Acorn, 1992: 217, 226.

sexguttata Fabricius, 1775: 226 (as species). VA; ND SD/ MN WI MI ON PQ/ NB NS/ NE KS IA MO IL IN OH KY/ NY PA NJ DE MD WV VA/ ME NH VT MA RI CT/ TX OK/ AR LA MS AL TN GA SC NC FL.

varians Ljungh, 1799: 147 (as species). Outside Europe.

violacea Fabricius, 1801: 232 (as species). Carolina.

guttata Emmons, 1854: 35 (as species; preoccupied Wiedemann, 1823: 63). The type-locality, though not recorded, is probably NY.

harrisii Leng, 1902a: 128 (as new variety of *C. sexguttata* Fabricius). Southwestern Catskill Mountains, NY; Lake Memphremagog, Canada; mountains of NC; western CT; occurring always at elevations of 1,000 ft. or over. Four cotypes are deposited in MCZC.
TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.

quadriguttata Davis, C.A., 1903: 271 (as new variety of *C. sexguttata* Fabricius; preoccupied Wiedemann, 1821: 116). Northern RI into MA.

levettei Casey, 1909: 270 (as species). IA; IA.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

tridens Casey, 1909: 271 (as subspecies of *C. levettei* Casey). Northwestern LA: Vowell's Mill, to KS: Onaga.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

illinoensis Mares, 1921: 310 (as species). IL: Riverside.
TYPE DEPOSITORY: INHS.
SEX OF TYPE: M.

kansanus Knaus, 1928b: 24. KS: Pottawatomie Co., near Onaga; NE KS IA.

IMMATURE STAGES: Drew and Van Cleave, 1961: 105, 115; Hamilton, C.C., 1925: 17, 23, (figs. 58, 94, 124); Shelford, 1908: 167, and 1911: 578; Valenti, 1996b: 47; Walsh, 1864: 286.
TAXONOMY: Acciavatti et al., 1992: 54, 63, (fig. 8); Angell, 1916: 101, and 1920: 246; Arnett, 1963: 51, (fig. 13), and 1993: 287; Beaulieu, 1900: 139; Bethune, 1873: 646; Blackwelder, 1939: 8; Blatchley, 1910: 30, 32, (figs. 12, 16); Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 60; Bowditch, 1896: 2; Boyd, 1973: 5, and 1978: 199, 211, (fig. 10); Boyd et al., 1982: 8; Brown, 1930b: 146; Bruner, 1901: 98; Caron, 1951: 180, 182; Cartwright, 1935: 73; Chagnon and Robert, 1962: 79, (fig. 5A), 374; Choate, 1975: 73; Ciegler, 1997: 184, 190, (fig. 13); Cresson, 1861: 18; Dahl, 1941: 190; Davis, C.A., 1903: 271; Davis, W.T., 1899: 176, 1910: 84, 1911a: 217, 1912a: 19, 1915b: 82, 1919c: 75, and 1919d: 246; Dawson and W. Horn, 1928: 7; Dejean, 1821: 1, 1825: 53, and 1837: 3; Dillon and Dillon, 1961: 51, 55, (pl. 5, fig. 7); Ditmars, 1895: 62; Dow, 1911: 272; Downie and Arnett, 1996: 80, 82, (fig. 3.11); Drew and Van Cleave, 1961: 103, 104, 115; Dunn, G.A., 1981a: 8, (fig. 16), and 1986b: 29; Easton, 1909: 36; Eckhoff, 1939: 206, 217-219; Edwards, J.G., 1949: 73; Ehrmann, 1897: 169; Emmons, 1854: 35; Evans, J.D., 1895: 142; Fabricius, 1781: 286, and 1787: 187; Fattig, 1935: 154, and 1951: 72; Fleutiaux, 1892: 96, 97, 120; Forbes, 1926: 59, (pl. 7, figs. 5, 6); Fox, W.J., 1902b: 198; Gameau, 1979: 15; Gaumer and Murray, 1971: 10; Gaumer et al., 1970: 6; Gemminger and Harold, 1868: 26;

Gistl, 1837: 30; Glaser, 1984: 66, 75; Gould, 1834: 45; Goulet, 1983: 17, 21, (fig. 4); Graves, 1963: 496, 506, (fig. 9), and 1965: 65; Graves and Brzoska, 1991: 4, 5, 17, (cover photograph, fig. 21); Graves and Pearson, 1973: 159, 163, 173, (fig. 10); Green, 1918: 119; Greene, 1914b: 237; Harrington, 1882a: 7, 8, 1883a: 239, and 1883b: 35; Harris, E.D., 1902: 217, 1911: 29-32, and 1918b: 237; Harris, E.D. and Leng, 1916: 8; Harris, T.W., 1852: 1, (fig. R); Hood, L.E., 1902: 83, and 1903: 115; Horn, G.H., 1892: 27, (fig. 12); Horn, W., 1900a: 118, 1915: 380, 381, 1926: 278, 279, 1928: 12, 1930: 83, and 1938: 49, (pl. 75, figs. 20, 21); Houghton, 1908: 400; Huber, 1969a: 20, 22, and 1986: 55; Janvrin, 1923: 195; Johnson, H.L., 1915: 307; Jules, 1937: 2, 4, (fig. 1); Kaulbers, 1982: 1; Kaulbars and Freitag, 1993b: 267; King, B.L., 1988: 45; Kirk, 1969: 7, and 1970: 7, 8; Kirk and Balsbaugh, 1975: 13; Knaus, 1886: 87, 1897: 199, 1899: 40, 1900a: 111, 1928b: 23, and 1930: 79; Knisley and Schultz, 1997: 92, 127, (photo. 24); Knisley et al., 1987a: 282, 283; Kritsky et al., 1996: 29; Landry, L.P., 1979a: 44, and 1979c: 46; Lantz, 1905: 255; Lantz and E.D. Harris, 1915: 198; Larochelle, 1972b: 53, 1974g: 88, 1975b: 25, 77, 1976a: 78, (fig. 390), 1976b: 74, 79, (fig. 13), 1977c: 66-72, 1979a: 15, 1979b: 7, 1979c: 9, 1979e: 19, 1979f: 19, 1979g: 53, 1980a: 37, 1980b: 40, 41, 1985: 67, 1986c: 33-48, 1986d: 62, 1987a: 24-31, 1987b: 51-57, 1989a: 21, 24, and 1989b: 41-47; Larson, P.R., 1981: 52; Lawton, 1970b: 1, 2, 6; LeConte, 1848: 176, and 1860: 36, (fig. 11); Leng, 1902a: 115, 128, 129, 1902b: 132, 1902c: 174, 1902f: 252, 1910a: 73, 1911: 210, 1912, 4, 14, 1915: 563, 1918: 140, and 1920: 41; Leng and Beutenmüller, 1893: 92, and 1894b: 88, 91, (fig. 9); Leng and Mutchler, 1927: 7, and 1933: 9; Liard, 1979a: 16; Liebeck, 1890: 158; Liebherr and Mahar, 1979: 188; Lindroth, 1954a: 300; Linnaeus, 1788: 1921; Löding, 1910: 131; Mather, 1971: 22; Melsheimer, 1806: 46; Montgomery and Montgomery, 1931: 358; Morgan, A.V., 1987: 360; Morris, 1908: 444; Nagano et al., 1982: 341; Nicolay, 1916b: 18, and 1931c: 494; Notman, 1920a: 14, and 1920b: 178; Olivier, 1791: 725, 733; Papp, H., 1952: 517; Paxon, 1908: 325; Pearson et al., 1997: 36; Pettit, 1869: 106; Popenoe, 1877: 22; Provancher, 1870: 221; Rivalier, 1954: 253; Roch, 1979: 44; Rogers, R.V., 1880: 64, (fig. 12), and 1881: 24; Say, 1818: 414, 425; Schaeffer, 1909: 192; Schaupp, 1884a: 80, 88, (pl. 2, figs. 32-34); Schilder, 1953b: 562; Scudder, 1869: 20; Shelford, 1917: 1; Sherman, F., 1904: 28; Shoemaker and W.T. Davis, 1915: 157; Slosson, 1895a: 5; Smith, J.B., 1909: 197; Stork, 1984: 138; Suffrian, 1867: 445; Summers, 1873: 132; Torre-Bueno, 1903: 249; Townsend, 1883: 205, and 1884a: 125; Valenti, 1986a: 4; Wallis, 1961: 13, 30, 69, (pl. 4, figs. 91-93); Ward, 1971: 71, 72, (figs. 3-10); Ward and Bowling, 1980: 29; Werner, K., 1993: 68, (pl. 19, fig. 156); Wickham, 1894: 151, (fig. 12), and 1911: 5; Wiesner, 1992: 130; Williams, J., 1879: 39; Willis, 1968: 311, and 1970: 6, (fig. 20); Wilson, D.A. and Brower, 1983: 12, (fig. 10); Wolcott, 1895: 309.

REDESCRIPTION: Leng, 1902a: 128, (pl. III).

BIOLOGY: Acciavatti et al., 1992: 63; Baker and Monroe, 1995: 25; Blanchard, 1921: 397; Blatchley, 1910: 32; Brimley, 1906: 85; Cartwright, 1935: 73; Cutler, 1969b: 14; Davis, W.T., 1917c: 137, and 1918c: 239; Dunn, G.A., 1978: 2, and 1981b: 9; Erwin, 1981: 124, 137; Forbes, 1924: 256; Freitag and Tropea, 1969: 16, and 1971: 53; Frost, C.A., 1929: 219; Frost, S.W., 1924: 181; Glaser, 1976: 17, and 1984: 75; Goldsmith, 1916: 448-454, and 1919: 437, 444; Graves, 1963: 506, and 1965: 65; Graves and Brzoska, 1991: 17; Graves and Pearson, 1973: 173; Harris, E.D., 1917: 137; Harris, T.W., 1891: 170; Kennaught, 1963: 284; King, I.N., 1914: 319; Knisley, 1976: 228; Knisley and Hill, 1992: 133; Knisley and Schultz, 1997: 92, 127, (photo. 24); Knisley et al., 1987a: 282; Kritsky and Simon, 1995: 143, (figs. 1, 2), and 1996: 23; Lantz and E.D. Harris, 1915: 198; Larochelle, 1972c: 67, 1973a: 32, 1973b: 58, 1973c: 6, 1974a: 18, 1974c: 31, 1974f: 83, 84, 1974h: 99, 100, 1975a: 1, 3, 5, 1975c: 9, 10, 1978c: 24, 25, 1980b: 41, and 1989a: 19, 20; Lavigne, 1972: 2; Lawton, 1971b: 61, 63-65, 68, and 1974a: 17; Leng, 1902b: 132, and 1912: 7; Meserve, 1936: 272; Moennich, 1931: 268; Nelson and LaBonte, 1989: 50-51; Palmer, 1981: 36; Pearson et al., 1988: 407, 412; Riley, 1877: 98; Schaupp, 1878e: 35; Schultz, 1986: 145, 1989: 468, and 1998: 1; Serrano and Yadov, 1984: 337; Shelford, 1907: 13, 1911: 551, 1915a: 294, (fig. 4), and 1917: 1; Sherman, F., 1908: 360; Smith, S.G., 1953: 33; Smyth, 1905: 425, and 1908: 182-184; Vaurie, 1950b: 152; Wickham, 1899d: 213; Will et al., 1995: 62; Wilson, D.A., 1978: 15; Wilson, D.S., 1978: 128; Yadav et al., 1985: 5.

HABITAT: Shaded paths through rich deciduous woods, or in pastures near such situations (Wallis, 1961: 32).

splendida Hentz, 1830: 254 (as species). NC; MN WI/ WY CO/ NE KS IA MO IL IN OH KY/ PA

MD DC WV VA/ NM TX OK/ AR LA MS AL TN GA SC NC.

TYPE DEPOSITORY: MCZC.

discus Klug, 1834: 23 (as species). Type-locality not given.

cyanocephala Varas Arangua, 1929a: 239 (as form of *C. purpurea splendida* Hentz; preoccupied Fabricius, 1798: 60). KS, NE.

cyanocephalata Eckhoff, 1939: 211 (as variety of *C. splendida* Hentz; replacement name for *C. cyanocephala* Varas Arangua).

cyanocephalanota Eckhoff, 1970: 32 (as replacement name for *cyanocephalata* Eckhoff, 1939: 211).

IMMATURE STAGES: Riley, 1878: 315, (fig. 50).

TAXONOMY: Acciavatti et al., 1992: 54, 61, (fig. 6); Arnett, 1993: 287; Beaulieu, 1900: 140; Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 60; Boyd et al., 1982: 8; Bruner, 1901: 98; Casey, 1913, 8; Ciegler, 1997: 180, 190, (fig. 12); Cresson, 1861: 18; Dahl, 1941: 171; Davis, A.C., 1929: 100; Davis, W.T., 1916b: 154; Dawson and W. Horn, 1928: 8; Dillon and Dillon, 1961: 51, 54, (pl. VI, fig. 4); Downie and Arnett, 1996: 80, 82, (fig. 3.10); Drew and Van Cleave, 1961: 104, 115, (fig. 19); Eckhoff, 1939: 207, 210; Fleutiaux, 1892: 98; Fox, W.J., 1902b: 198; Gaumer and Murray, 1971: 9; Gemminger and Harold, 1868: 26; Gistl, 1837: 31; Glaser, 1984: 66, 71; Graves and Brzoska, 1991: 4, 6, 16, (fig. 20); Graves and Pearson, 1973: 159, 164, 171, (fig. 9); Harris, E.D., 1911: 7; Harris, E.D. and Leng, 1916: 4; Harris, T.W., 1852: 1, (fig. O); Hoffman, 1991: 176; Horn, G.H., 1892: 27, (fig. 14); Horn, W., 1903a: 192, 1915: 373, 1926: 265, 1930: 80, and 1938: 48, (pl. 72, fig. 16); Huber, 1969a: 20, and 1986: 54; Johnson, W.N., 1979: 26; Kippenhan, 1990a: 310, and 1994: 24, 46, (fig. 29); Kirk, 1970: 7; Knaus, 1900a: 112; Knisley and Schultz, 1997: 93, 129, (photo. 25); Knisley et al., 1987a: 282, 283, (fig. 19); Kritsky et al., 1996: 29; Lantz, 1905: 256; LaRivers, 1946: 136; Larochelle, 1986c: 36-42, 1987a: 29-31, 1987b: 55-58, and 1989a: 18, 24; Lawton, 1972b: 36; LeConte, 1848: 176, 1860: 36, (fig. 13), and 1866: 363; Leng, 1902a: 128, 135, 1902b: 131, 1918: 140, and 1920: 40; Leng and Beutenmüller, 1893: 92, and 1894b: 89, 92; Leng and Mutchler, 1933: 9; Mather, 1971: 22; Nicolay, 1934: 129, 130; Nicolay and Weiss, 1932: 350; Pearson et al., 1997: 36; Popenoe, 1877: 22; Provancher, 1870: 222; Rivalier, 1954: 253; Schaupp, 1879a: 1, and 1884a: 80, 90, (pl. 2, figs. 45, 46); Schilder, 1953a: 314, and 1953b: 562; Schincariol, 1988: 1; Schincariol and Freitag, 1991: 1327, 1345; Shelford, 1917: 1; Sherman, F., 1904: 29; Smyth, 1933: 197, and 1935: 14; Steyskal, 1971: 34; Summers, 1873: 132; Valenti, 1986a: 5; Varas Arangua, 1929a: 237; Ward, 1971: 70, (fig. 1); Werner, K., 1993: 67, (pl. 18, fig. 150); Wickham, 1894: 151, and 1911: 5; Wiesner, 1992: 129; Willis, 1968: 315, and 1970: 6, (fig. 21).

REDESCRIPTION: Leng, 1902a: 135.

BIOLOGY: Acciavatti et al., 1992: 61; Cartwright, 1935: 70; Cutler, 1969b: 14; Glaser, 1984: 71; Graves and Brzoska, 1991: 16; Graves and Pearson, 1973: 172; Harris, E.D., 1913c: 85; Jones, 1884: 75; Kippenhan and Carter, 1993: 49; Knisley, 1979: 213; Knisley and Schultz, 1997: 93, 129, (photo. 25); Knisley et al., 1987a: 282; Larochelle, 1974c: 32; Lawton, 1971b: 61-64, 66, 68, and 1972b: 38; Meserve, 1936: 271; Pearson et al., 1988: 412; Rumpp, 1956a: 142; Schincariol and Freitag, 1991: 1327; Schultz, 1989: 468; Schultz and Rankin, 1985a: 87, and 1985b: 111; Sherman, F., 1908: 361; Smyth, 1905: 425-429, and 1908: 180-183; Wickham, 1899d: 216.

HABITAT: Red clay banks and road cuts with sparse to thick grass, areas moist and partially shaded; occasionally in dry, exposed areas (Graves and Pearson, 1973: 172); margins of small duck ponds (Davis, A.C., 1928: 65).

theatina Rotger, 1944: 76, fig. 1 (as species). CO: San Luis Valley, edge of Great Sand Dunes; on the side of Mosca Pass where the road approaches the Sand Dunes. CO. One paratype (no. 3820) is deposited in SEMC.

TYPE DEPOSITORY: CRBR.

SEX OF TYPE: M.

TAXONOMY: Acciavatti and Bowe, 1991: 60; Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 7; Byers and Karren, 1968: 3; Freitag, 1965: 102, (figs. 9, 10), and 1972b: 1279, 1291, (figs. 33-36, 105-112); Kippenhan, 1990a: 310, 1994: 24, 36, (fig. 24), and 1995b: 56; Larochelle, 1979: 15, 1986a: 15, and 1987a: 25; Pearson et al., 1997: 36; Rumpp, 1967: 132, (fig. 3); Werner, K., 1993: 64, (pl. 16, fig. 131); Wiesner, 1992: 122; Willis, 1968: 313.

BIOLOGY: Larochelle, 1978c: 24; Leffler, 1975: 28, 29; Rumpp, 1961: 184.
HABITAT: In spots of scanty vegetation and where shifting sands begin; not present where vegetation is nonexistent (Rotger, 1944: 76).

Subgenus TRIBONIA Rivalier

Tribonia Rivalier, 1954: 254 (as subgenus of *Cicindela* Linnaeus). Type-species: *Cicindela tranquebarica* Herbst (orig. des.).
TAXONOMY: Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 6; Rivalier, 1954: 250, 254, and 1963: 46; Vogler and Welsh, 1997: 225; Wiesner, 1992: 132.

ancocisconensis Harris, T.W., 1852: 305 (as species). NH: mountain streams near the White Mountains: PQ/ MO? IL IN OH/ NY PA MD WV VA/ ME NH VT MA/ TN GA NC.
TYPE DEPOSITORY: MCZC.

catharina Harris, T.W., 1869: 229 (unjustified replacement name for *C. ancocisconensis* Harris, T.W.).

dowiana Casey, 1914a: 23 (as subspecies of *C. ancocisconensis* Harris, T.W.). NY: DeBruce.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

carolinae Casey, 1916: 28 (as subspecies of *C. ancocisconensis* Harris, T.W.). NC.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

eriensis Casey, 1916: 29 (as subspecies of *C. ancocisconensis* Harris, T.W.). NY: Buffalo.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

IMMATURE STAGES: Wilson, D.A., 1974: 79; Wilson, D.A. and Larochelle, 1979: 46.
TAXONOMY: Angell, 1931: 269; Acciavatti et al., 1992: 54, 67, (fig. 11); Austin, 1874: 266; Blatchley, 1910: 31, 34, (fig. 19); Bousquet, 1991: 8; Bousquet and Larochelle, 1993: 54; Boyd et al., 1982: 9; Bruner, 1901: 98; Caron, 1951: 180, 183; Casey, 1913: 27; Chagnon and Robert, 1962: 375; Chantal, 1970: 13; Cresson, 1861: 10; Davis, W.T., 1916b: 154, and 1917c: 137; Dow, 1910: 131, and 1911: 272; Downie and Arnett, 1996: 80, 82, (fig. 3.14); Dunn, G.A., 1979: 61, (figs. 2, 3), 1981a: 1, (fig. 2), and 1986b: 29; Fattig, 1935: 154; Fleutiaux, 1892: 93; Gemminger and Harold, 1868: 9; Glaser, 1984: 66, 71; Graves and Brzoska, 1991: 4, 6, 21, (fig. 25); Haldeman, 1853: 361; Harris, E.D., 1911: 9, 1916b: 311, 1917: 137, and 1918: 237; Harris, E.D. and Leng, 1916: 5; Hayward, 1882: 38; Hoffman, 1991: 176; Horn, W., 1915: 374, 444, 1926: 267, 1930: 80, and 1938: 48, (pl. 73, fig. 1); Huber, 1969a: 20; Knisley and Schultz, 1997: 93, 99, (photo. 4); Knisley et al., 1987a: 283, (fig. 18); Larochelle, 1971a: 1, 1972b: 58, 1974c: 22, 1974g: 87, 1975b: 25, 74, 1976a: 78, (fig. 394), 1976b: 74, 76, (fig. 17), 1977c: 71, 1986c: 34-44, 1986d: 59, 1987a: 30, and 1989b: 46; LeConte, 1860: 38, (fig. 15); Leng, 1902a: 116, 143, 1910b: 131, 1912a: 9, 14, and 1920: 40; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 92, (fig. 14); Montgomery and Montgomery, 1931: 358; Pearson et al., 1997: 35; Reed, 1886: 178, and 1887: 14; Reinecke, 1897: 13; Rivalier, 1954: 254; Schaupp, 1884a: 81, 93, (pl. 2, fig. 47; pl. 5, fig. 130); Wallis, 1961: 15, 57, 70; Werner, K., 1993: 72, (pl. 22, fig. 184); Wiesner, 1992: 132; Willis, 1968: 314; Wilson, D.A. and Brower, 1983: 16, 30, (fig. 12); Wilson, D.A. and Larochelle, 1979: 33.
REDESCRIPTION: Leng, 1902a: 143, (pl. II, III); Wilson, D.A. and Larochelle, 1979: 34.
BIOLOGY: Acciavatti et al., 1992: 67; Blatchley, 1910: 34; Dow, 1911: 272; Dunn, G.A., 1978: 2, and 1981a: 1; Glaser, 1984: 71; Goldsmith, 1916: 448, 454, and 1919: 437, 444; Graves and Brzoska, 1991: 21; Knisley and Schultz, 1997: 93, 99, (photo. 4); Kritsky and Simon, 1995: 146; Larochelle, 1973c: 6, and 1989a: 20; Nelson and LaBonte, 1989: 49, (fig. 1); Serrano and Yadov, 1984: 337; Smith, S.G., 1953: 33; Smith, S.G. and Edgar, 1954: 657; Wickham, 1899d: 218; Wilson, D.A. and Brower, 1983: 16; Wilson, D.A. and Larochelle, 1979: 40; Yadav et al., 1985: 5.
HABITAT: Banks of mountain streams, automobile roads, and red clay wheat fields (Wilson, D.A. and Larochelle, 1979: 41); sandy field (Stamatov, 1970: 12); river banks of marine clay mixed on the upper shores with sand, very sparsely vegetated (Chantal, 1970: 13).

latesignata latesignata LeConte, 1851: 172 (as species). CA: San Diego; CA; Mex.
TYPE DEPOSITORY: MCZC.

obliviosa Casey, 1913: 20 (as subspecies of *C. latesignata* LeConte). CA: San Diego.
TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Hamilton, C.C., 1925: 18, 29, (figs. 61, 98, 128); Valenti, 1996b: 46.
TAXONOMY: Bates, 1881: 4; Blackwelder, 1944: 18; Blaisdell, 1892: 47, and 1925: 80; Bousquet and Larochelle, 1993: 56, 57; Boyd et al., 1982: 10; Cazier, 1948: 13, (figs. 24, 25), and 1954: 241-242, (fig. 1); Cresson, 1861: 14; Dunn, G.W., 1891: 153; Fleutiaux, 1892: 108; Gemminger and Harold, 1868: 20; Harris, E.D., 1911: 22; Harris, E.D. and Leng, 1916: 5; Horn, G.H., 1894: 306; Horn, W., 1902a: 235, 1903c: 215, 1915: 375, 376, 1926: 270, 1930: 81, and 1938: 48, (pl. 73, figs. 10-12); Horn, W. et al., 1897: 165; Ingram, 1934: 52; LeConte, 1858: 27, and 1860: 39, (fig. 19); Leng, 1902a: 115, 116, 135, 138, (pl. III), and 1920: 40; Nagano, 1982: 37; Papp, H., 1952: 504; Pearson et al., 1997: 36; Richman, 1969: 19, 21, (fig. 5); Rivalier, 1954: 252, (fig. 1c), 254; Schaupp, 1884a: 81, 91, (pl. 3, figs. 57, 58); Schilder, 1953b: 563; Valenti, 1986a: 2; Werner, K., 1993: 74, (pl. 25, fig. 203); Wiesner, 1992: 134; Willis, 1968: 316.
BIOLOGY: Huber, 1989: 12; Ingram, 1934: 51; Kritsky and Simon, 1995: 146; Moore, I., 1937: 3; Wickham, 1899d: 217.
HABITAT: Ocean beaches, alkaline flats near sloughs and estuaries that are affected by tides (Cazier, 1954: 241).

lengi jordai Rotger, 1974: 9, fig. Right (as subspecies of *C. lengi* Horn, W.). NM: San Juan Co., Heart Canyon, 4 mi. N. of Aztec; WY/ AZ NM.
TYPE DEPOSITORY: CRBR.
SEX OF TYPE: M.
TAXONOMY: Acciavatti and Bowe, 1991: 60; Acciavatti et al., 1979: 30; Bertholf, 1983: 7, 12, (fig. 9); Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 9; Kippenhan, 1990a: 311, and 1994: 57; Larochelle, 1987a: 23, and 1987b: 55; Werner, K., 1993: 72, (pl. 23, fig. 187); Wiesner, 1992: 133.
HABITAT: Sandy banks of dry washes, frequently on bed of canyon itself (Rotger, 1974: 11).

lengi lengi Horn, W., 1908a: 738 (replacement name for *C. venusta* LeConte). Habitat beside Platte River; CO/ NE KS IA MO/ NM OK.

venusta LeConte, 1848: 179 (as species; preoccupied LaFerté-Sénectère, 1841: 37). Habitat beside Platte River.
TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Criddle, 1919: 12.
TAXONOMY: Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 9; Bruner, 1901: 98; Cresson, 1861: 19; Criddle, 1921: 72; Drew and Van Cleave, 1961: 105, 110, (fig. 15); Eckhoff, 1939: 206, 208; Fall, 1895: 176; Fall and Cockerell, 1907: 155; Fletcher, J., 1903: 87; Fleutiaux, 1892: 94; Gemminger and Harold, 1868: 29; Gibson, 1914: 106; Harris, E.D., 1911: 3; Harris, E.D. and Leng, 1916: 4; Horn, W., 1915: 372, 1926: 263, 1930: 79, and 1938: 48, (pl. 72, figs. 7-9); Huber, 1969a: 22, and 1986: 55; Kippenhan, 1990a: 311, and 1994: 24, 55, (fig. 38); Knaus, 1884a: 57, 1894: 126, 1915a: 35, 1915b: 84, 1924b: 171, and 1926: 263; Lantz, 1905: 257; Larochelle, 1985: 67, and 1989b: 43, 44; LeConte, 1848: 179, 184, 1860: 39, (fig. 16), and 1866: 363; Leng, 1902a: 137, and 1920: 40; Pape and W. Horn, 1908: 738; Papp, H., 1952: 512; Pearson et al., 1997: 36; Rivalier, 1954: 254, (fig. 2c); Rotger, 1974: 9; Schaupp, 1884a: 80, 91, (pl. 2, fig. 51); Schilder, 1953b: 563; Snow, 1877b: 16, 1878b: 63, and 1903: 192; Wallis, 1961: 54, (pl. 2, figs. 17, 18); Werner, K., 1993: 72, (pl. 23, fig. 185); Wiesner, 1992: 132; Willis, 1968: 314, and 1970: 4, (fig. 10).
REDESCRIPTION: Leng, 1902a: 137, (pl. III).
BIOLOGY: Criddle, 1907: 109, and 1915: 26; Johnson, W.N., 1975b: 34; Jones, 1884: 75; Kippenhan, 1990b: 53; Knaus, 1897: 197, 1900a: 113, and 1928a: 99; Knisley, 1984: 93; Kritsky and Simon, 1995: 146; Meserve, 1936: 270; Rogers, L., 1974: 73; Smyth, 1905: 428-429; Vaurie, 1950b: 147; Wickham, 1899d: 217; Willis and Stamatov, 1971: 45.
HABITAT: Variety of sand habitats from dunes to clay soil (Kippenhan, 1994: 58; Lawton, 1972b: 37, 39).

lengi versuta Casey, 1913: 24 (as subspecies). MB: Aweme; AB SK MB MT ND SD/ WY.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

gracilenta Casey, 1913: 25 (as subspecies of *C. venusta* LeConte). MT.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

IMMATURE STAGES: Leffler, 1979a: 89; Valenti, 1996b: 48.
TAXONOMY: Acciavatti et al., 1979: 30; Bousquet, 1991: 9; Bousquet and Larochelle, 1993: 57; Boyd et al., 1982: 9; Gibson, 1914: 106; Harris, E.D. and Leng, 1916: 4; Hatch, 1953: 40; Hilchie, 1985: 323, 330, (fig. 23); Hooper, 1969: 3; Horn W., 1915: 372, and 1926: 263; Kippenhan, 1990a: 311, and 1994: 57; Kirk and Balsbaugh, 1975: 12; Larochelle, 1989b: 44; Larson, P.R., 1981: 52; Leffler, 1979a: 559; Leng, 1920: 40; Rotger, 1974: 9; Valenti, 1986a: 2; Wallis, 1961: 54, 70, (pl. 2, figs. 19-21); Werner, K., 1993: 72, (pl. 23, fig. 186); Wiesner, 1992: 133; Willis, 1968: 314.
BIOLOGY: Acorn, 1991: 17, 1992: 217, 227, and 1994: 9; Cutler, 1970: 10; Dunn, G.A., 1978: 2; Hilchie, 1985: 330; Larochelle, 1987a: 23, and 1987b: 55; Lawton and Willis, 1974: 48; Pearson and Juliano, 1991: 224; Pearson and Mury Meyer, 1979: 564; Pearson et al., 1988: 412.
HABITAT: Sandy soil among grasses (Freitag and Tropea, 1971: 55, 56; Lawton, 1972b: 39; Wallis, 1961: 55; Willis and Stamatov, 1971: 45).

tenuicincta Schaupp, 1884b: 122, fig. p. 122 (as variety of *C. latesignata* LeConte). CO; OR/ CA NV/ UT. The type-locality is probably incorrect.
TYPE DEPOSITORY: USNM (type no. 1204).
SEX OF TYPE: F.
TAXONOMY: Blaisdell, 1892: 47; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 9; Cazier, 1939a: 27; Erwin and House, 1978: 236; Harris, E.D., 1911: 16; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 40; Horn, W., 1902a: 235, 1915: 377, 1926: 272, 1930: 81, and 1938: 49, (pl. 74, fig. 7); Knaus, 1902: 151; Larochelle, 1977c: 69, and 1987b: 58; Leffler, 1979a: 551; Leng, 1902a: 116, 135, 138, and 1920: 41; Maser and Beer, 1984: 48, (fig. 17); Pearson et al., 1997: 36; Rivalier, 1954: 254; Schilder, 1953b: 563; Tanner, V.M., 1929: 81; Werner, K., 1993: 72, (pl. 23, fig. 186); Wiesner, 1992: 133; Willis, 1968: 317.
REDESCRIPTION: Leng, 1902a: 138, (pl. III).
BIOLOGY: Wickham, 1899d: 217, and 1904a: 44.
HABITAT: Large open salt flats of Great Salt Lake and other lakes, along edges of alkaline streams (Freitag and Tropea, 1971: 54; Lawton, 1972b: 42; Lawton and Willis, 1979: 51).

tranquebarica arida Davis, A.C., 1928: 65 (as species). CA: Death Valley Junction.; CA NV. One paratype (no. 1078) is deposited in SEMC.
TYPE DEPOSITORY: USNM (type no. 56263).
SEX OF TYPE: M.

propinqua Knaus, 1922: 194 (as variety of *C. denverensis* Casey; preoccupied Chaudoir, 1835: 434). NV: Nye Co., Ash Meadow.
SEX OF TYPE: M.

TAXONOMY: Blackwelder, 1939: 7; Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Byers and Karren, 1968: 3; Cazier, 1939a: 27; Davis, A.C., 1929: 100; Döbler, 1973: 359; Erwin and House, 1978: 236; Horn, W., 1926: 266, 1930: 81, and 1938: 49, (pl. 74, fig. 3); Huber, 1969a: 21, and 1986: 55; LaRivers, 1946: 136; Larochelle, 1986a: 13, and 1986c: 42; Leng and Mutchler, 1927: 7, and 1933: 9; Nicolay and Weiss, 1932: 352; Rivalier, 1954: 254; Rumpp, 1956a: 142; Schilder, 1953b: 562; Smyth, 1933: 197, and 1935: 14; Sumlin, 1976a: 104; Valenti, 1986a: 5; Werner, K., 1993: 74, (pl. 24, fig. 201); Wiesner, 1992: 134.
HABITAT: Margin of a small stream (Lawton, 1972b: 41).

tranquebarica borealis Harris, E.D., 1911: 19 (as variety of *C. tranquebarica* Herbst). BC: Kootenay Region; BC WA ID.

TYPE DEPOSITORY: MCZC (cotypes).
TAXONOMY: Bousquet, 1991: 10; Boyd et al., 1982: 10; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 39; Horn, W., 1915: 376, 1926: 271, and 1930: 81; Knowlton and Wood, 1946: 91; Leech, 1947: 105; Leffler and Pearson, 1976: 51; Leng, 1918: 140, and 1920: 40; Sumlin, 1976a: 103; Wallis, 1961: 57, (pl. 3, fig. 53); Werner, K., 1993: 73, (pl. 24, fig. 196); Wiesner, 1992: 134.
BIOLOGY: Acorn, 1994: 12; Cazier, 1939a: 26.
HABITAT: Alkaline-coated sands of a small alkaline lake (Lawton, 1972b: 42; Lawton and Willis, 1974: 51).

tranquebarica diffracta Casey, 1909: 273 (as species). NM: Las Vegas; AZ NM.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

admiscens Casey, 1913: 25 (as species). NM: Jemez Springs.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

IMMATURE STAGES: Leffler, 1979a: 90; Valenti, 1996b: 48.
TAXONOMY: Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Harris, E.D. and Leng, 1916: 6; Horn, W., 1915: 376, 1926: 271, 1930: 81, and 1938: 48, (pl. 73, fig. 22); Huber, 1986: 55; Lawton and Willis, 1974: 49; Leffler, 1975: 29; Leng, 1920: 41; Rivalier, 1954: 254; Schilder, 1953b: 563; Tanner, V.M., 1929: 80; Werner, K., 1993: 73, (pl. 23, fig. 191); Wiesner, 1992: 133; Willis, 1968: 314.
BIOLOGY: Hadley and Schultz, 1987: 677; Knisley, 1984: 93; Schultz, 1986: 146.
HABITAT: Mudflats along the Dirty Devil River, UT (Lawton, 1972b: 40; Lawton and Willis, 1974: 49).

tranquebarica inyo Fall, 1917: 106 (as variety of *C. tranquebarica* Herbst). CA: Olancha; CA NV.
TYPE DEPOSITORY: MCZC.
SEX OF TYPE: Sex of type and kind of type are in question.

owena Fall, 1917: 106 (as variety of *C. tranquebarica* Herbst). CA: Olancha.
TYPE DEPOSITORY: MCZC.
SEX OF TYPE: Sex of type and kind of type are in question.

TAXONOMY: Andrews, F.G. et al., 1979: 30; Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Cazier, 1939a: 27; Horn, W., 1926: 272, 1930: 81, and 1938: 48, (pl. 73, fig. 17); LaRivers, 1946: 136; Larochelle, 1987b: 54; Leng, 1920: 41; Rivalier, 1954: 254; Schilder, 1953b: 563; Sumlin, 1976a: 103; Tanner, V.M., 1928: 269, and 1929: 81; Valenti, 1986a: 5; Werner, K., 1993: 74, (pl. 24, fig. 200); Wiesner, 1992: 134.
BIOLOGY: Andrews, F.G. et al., 1979: 30; LaRivers, 1946: 136.
HABITAT: Wet mud flats bordering Owens Lake (Lawton, 1972b: 42).

tranquebarica kirbyi LeConte, 1866: 362. North America. NT/ AB SK MB MT ND/ NV/ WY UT CO/ MO.
TYPE DEPOSITORY: BMNH.
TAXONOMY: Bertholf, 1983: 8, 26, (fig. 30); Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 9; Casey, 1913: 26; Cazier, 1939a: 27; Cresson, 1861: 20; Dawson and W. Horn, 1928: 11; Dejean, 1826: 414, and 1837: 3; Dunn, G.W., 1891: 154; Engelhardt, 1918: 230; Fleutiaux, 1892: 94; Harris, E.D., 1911: 18; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 39; Hilchie, 1985: 324, 331, (fig. 19); Horn, W., 1902a: 235, 1903a: 193, 1904: 88, 1915: 376, 1926: 271, 1928: 11, 1930: 81, and 1938: 48, (pl. 73, fig. 21); Huber, 1969b: 26, and 1986: 55; Kippenhan, 1990a: 311, and 1994: 59, (fig. 40); Kirby, 1837: 10; Knowlton and Wood, 1946: 91; LaRivers, 1946: 136; Larochelle, 1986c: 38, and 1987b: 54; Lawton, 1972b: 40, 42; LeConte, 1860: 39, 40, and 1866: 362; Leffler, 1979a: 574; Leffler and Pearson, 1976: 51; Leng, 1902a: 144, 145, (pl. III), and 1920: 40; Rivalier, 1954: 254; Rumpp, 1956a: 139; Schaupp, 1884a: 81, 94, (pl. 5, fig. 128); Schilder, 1953b: 563; Sumlin, 1976a: 103; Tanner, V.M., 1927: 10, (figs. 195, 206), and 1929: 80; Valenti, 1986a: 5; Wallis, 1961: 57; Werner, K., 1993: 73, (pl. 23, fig. 190); Wiesner, 1992: 133.
BIOLOGY: Hadley and Schultz, 1987: 677; Hilchie, 1985: 331; Kippenhan, 1990b: 55, (fig. 2); Lawton, 1972b: 40, 42.

tranquebarica lassenica Casey, 1914a: 22 (as species). CA; CA/ UT/ AZ.
TYPE DEPOSITORY: USNM.
cibecuei Duncan, 1958: 43. AZ: Gila Co., near Cibecue, Cibecue Creek. A female allotype is deposited in AMNH.
TYPE DEPOSITORY: AMNH.
SEX OF TYPE: M.

TAXONOMY: Bertholf, 1983: 8, 26; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Harris, E.D. and Leng, 1916: 6; Horn, W., 1915: 444, 1926: 272, and 1930: 81; Larochelle, 1986a: 13; Leng, 1920: 40; Tanner, V.M., 1929: 80; Werner, K., 1993: 73, (pl. 24, fig. 194); Wiesner, 1992: 133.
BIOLOGY: Schultz, 1986: 146.

tranquebarica moapana Casey, 1914a: 22 (as species). NV: White Pine Co., McGill; NV/ UT.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.
IMMATURE STAGES: Leffler, 1979a: 90.
TAXONOMY: Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Harris, E.D. and Leng, 1916: 6; Horn, W., 1915: 444, 1926: 272, and 1930: 81; LaRivers, 1946: 136; Leng, 1920: 41; Sumlin, 1976a: 104; Tanner, V.M., 1929: 81; Werner, K., 1993: 73, (pl. 23, fig. 192); Wiesner, 1992: 133.
BIOLOGY: Leffler, 1975: 30.

tranquebarica parallelonota Casey, 1914a: 21 (as species). NV: Las Vegas; NV/ UT.
SEX OF TYPE: F.
uintana Casey, 1924: 15 (as subspecies of *C. kirbyi* LeConte). UT: Zion Canyon.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

TAXONOMY: Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Harris, E.D. and Leng, 1916: 6; Horn, W., 1915: 444, 1926: 272, 1930: 81, and 1938: 49, (pl. 74, figs. 1, 2); Knowlton and Wood, 1946: 91; Leng, 1920: 41; Rivalier, 1954: 254; Schilder, 1953b: 563; Sumlin, 1976a: 103; Tanner, V.M., 1929: 81; Werner, K., 1993: 73, (pl. 23, fig. 193); Wiesner, 1992: 133.

tranquebarica roguensis Harris, E.D., 1901a: 226 (as variety of *C. vulgaris* Say). Southwestern OR: Rogue River; WA OR ID/ MT/ WY.
TYPE DEPOSITORY: MCZC.
TAXONOMY: Bousquet, 1991: 10; Boyd et al., 1982: 10; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 39; Horn, W., 1915: 376, 1926: 271, and 1930: 81; Larochelle, 1987a: 27; Leffler and Pearson, 1976: 51; Leng, 1902a: 144, 146, and 1920: 41; Maser and Beer, 1984: 48, (fig. 15); Wallis, 1961: 59; Werner, K., 1993: 73, (pl. 24, fig. 195); Wickham, 1906b: 45; Wiesner, 1992: 133.

tranquebarica sierra Leng, 1902a: 144, 146, pl. III (as variety of *C. vulgaris* Say). CA: Sierra Co., CA. One cotype is deposited in MCZC.
TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: F.
TAXONOMY: Blaisdell, 1908: 499; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Harris, E.D., 1911: 19; Harris, E.D. and Leng, 1916: 6; Horn, W., 1915: 376, 1926: 272, 1930: 81, and 1938: 48, (pl. 73, figs. 23-28); Larochelle, 1977c: 65; Leng, 1918: 140, and 1920: 41; Rivalier, 1954: 254; Schilder, 1953b: 563; Werner, K., 1993: 73, (pl. 24, fig. 198); Wickham, 1906b: 45; Wiesner, 1992: 134.

tranquebarica tranquebarica Herbst, 1806: 178 (as species). Trankenbar (The type-locality is incorrect); NT/ OR ID/ AB SK MB MT ND SD/ MN WI MI ON PQ/ NB PE NS NF/ CA NV/ WY UT CO/ NE KS IA MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ ME NH VT MA RI CT/ TX OK/ AR LA MS TN GA SC NC.
vulgaris Say, 1818: 409 (as species). North America.
obliquata Dejean, 1825: 72 (as species). North America.

horiconensis Leng, 1902a: 145 (as variety of *C. vulgaris* Say). Canada, NY, ME, IL, WI. Specific type-localities in original description are: Lake George, NY; Hamilton, Canada; and Mount Desert, ME.

TYPE DEPOSITORY: AMNH (lectotype).
SEX OF TYPE: M.

minor Leng, 1910: 80 (as variety of *C. tranquebarica* Herbst). GA, LA and other southern states.

vulgarisminor Harris, E.D., 1911: 18 (as variety of *C. tranquebarica* Herbst). NC: river flats at Charlotte.

TYPE DEPOSITORY: MCZC (cotypes).

turbulenta Casey, 1913: 25 (as subspecies of *C. tranquebarica* Herbst). MS: Vicksburg.

TYPE DEPOSITORY: USNM.
SEX OF TYPE: F.

crinifrons Casey, 1913: 26 (as species). NC: Asheville and Southern Pines.

TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

wichitana Casey, 1914a: 21 (as species). KS.

TYPE DEPOSITORY: USNM.
SEX OF TYPE: FM.

viridula Varas Arangua, 1928: 173 (as variety of *C. tranquebarica* Herbst). MA, RI, CT, NY: Long Isl.

TYPE DEPOSITORY: CASC (type no. 8151).
SEX OF TYPE: F.

IMMATURE STAGES: Bram and Knisley, 1982: 99; Criddle, 1910: 13, and 1915: 27; Dow, 1916b: 74, (fig. 6); Drew and Van Cleave, 1961: 105, 117; Hamilton, C.C., 1925: 18, 36, (figs. 66, 103, 133); Larochelle, 1977a: 13, and 1987a: 30; Macnamara, 1922: 245; Mury Meyer, 1983: iii, and 1987: 167; Palmer, 1982: 61; Schaupp, 1879b: 23; Shelford, 1907: 12, 1908: 166, and 1911: 570; Valenti, 1996b: 47; Wickham, 1894: 150, (fig. 11).

TAXONOMY: Acciavatti et al., 1979: 30, and 1992: 54, 65, (fig. 10); Angell, 1923: 56, and 1930: 81; Austin, 1874: 266; Beaulieu, 1900: 140, (fig. 5); Bethune, 1870: 78, and 1873: 66; Blaisdell, 1892: 48; Blatchley, 1910: 31, 33, (figs. 15, 18); Boerner, 1894: 175; Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 61; Boyd, 1973: 5, and 1978: 199, 221, (fig. 13); Boyd et al., 1982: 9, 10; Brown, 1930a: 231, and 1930b: 146; Browning, 1900: 582; Bruner, 1901: 98; Caron, 1951: 180, 183; Chagnon and Fournier, 1939: 84; Chagnon and Robert, 1962: 80, (fig. 5D), 375; Choate, 1975: 72; Ciegler, 1997: 184, 191, (fig. 7); Cresson, 1861: 20; Criddle and Curran, 1923: 76; Dahl, 1941: 171-172; Davis, C.A., 1903: 272; Davis, W.T., 1895: 140, 1912a: 18, 1915a: 71, 1915d: 156, 1916b: 154, 1918b: 125, 1918e: 39, 1919c: 75, and 1919d: 246; Dawson and W. Horn, 1928: 11; Dejean, 1837: 3; Dillon and Dillon, 1961: 51, 55, (pl. V, fig. 6); Downie and Arnett, 1996: 80, 82, (fig. 3.15); Drew and Van Cleave, 1961: 104, 116, (fig. 20); Dunn, G.A., 1981a: 9, (fig. 17), and 1986b: 29; Dunn, G.W., 1891: 153; D'urban and Bell, 1860: 10; Easton, 1909: 36; Eckhoff, 1939: 206, 215; Edwards, J.G., 1949: 73; Ehrmann, 1897: 169; Emmons, 1854: 34; Evans, J.D., 1895: 142; Evans, J.E., 1903: 240, and 1906: 96; Fall and Cockerell, 1907: 155; Fattig, 1935: 154; Fisco, 1938: 38; Fletcher, F.C., 1929: 257; Fletcher, J., 1905: 56; Fletcher, J. and Gibson, 1908: 108, and 1909: 99; Fleutiaux, 1892: 93, 108; Foster and Knowles, 1990: 838; Fox, H., 1910: 82; Freitag, 1966: 942, (figs. 2, 7, 9, 10, 14, 17, 21); Frost, C.A., 1929: 219; Garneau, 1979: 15; Gaumer et al., 1970: 6; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 29; Glaser, 1984: 66, 73; Gould, 1834: 43; Goulet, 1983: 17, 22, (fig. 9); Graves, 1963: 496, 506, (fig. 11), and 1965: 68; Graves and Brzoska, 1991: 4, 6, 20, (fig. 24); Graves and Pearson, 1973: 159, 164, 176, (fig. 12); Hamilton, J., 1885b: 202; Hanham, 1894: 350; Harrington, 1882a: 7, and 1890: 138; Harris, E.D., 1901b: 27, 1902: 217, 1905a: 100, 1911: 16, 18, 1912b: 142, and 1918: 237; Harris, E.D. and Leng, 1916: 5; Harris, T.W., 1852: 1, (fig. 1); Hatch, 1924: 547, and 1953: 39; Hood, L.E., 1903: 115; Hooper, 1969: 4; Horn, G.H., 1866: 396, 1876c: 127, and 1892: 26, (fig. 1); Horn, W., 1902a: 235, 1902b: 380-392, 1903a: 181-193, 1904: 88, 1908b: 285, 1915: 375, 376, 444, 1926: 270, 271, 1928: 11, 1930: 81, and 1938: 48, (pl. 73, figs. 10, 11, 16); Houghton, 1908: 400; Huber, 1969a: 22, and 1986: 55; Johnson, H.L., 1915: 308; Jules, 1937: 2, 4, (fig. 3);

Kippenhan, 1990a: 311, and 1994: 24, 59, 60, (fig. 39); Kirby, 1837: 10; Kirk, 1969: 7, and 1970: 7; Kirk and Balsbaugh, 1975: 12; Knaus, 1893: 293, 1894: 126, 1900a: 113, 1902: 151, 1915a: 35, 1916: 79, 1922: 197, and 1926: 263; Knisley and Schultz, 1997: 93, 132, (photo 28); Knisley et al., 1987a: 282, 283, (figs. 13, 17); Landry, L.P., 1979c: 46; Lantz, 1905: 257; LaRivers, 1946: 136; Larochelle, 1971b: 5, 1972b: 58, 1973d: 139, 1974g: 88, 1975b: 25, 77, 1976a: 78, (fig. 393), 1976b: 74, 79, (fig. 16), 1977c: 66-73, 1977d: 42, 1979d: 14, 1980a: 37, 1980b: 41, 1986c: 33-48, 1986d: 62, 1987a: 22-33, 1987b: 53-57, 1989a: 24, and 1989b: 41-47; Larson, P.R., 1981: 52; Lawton, 1972b: 47; LeConte, 1848: 179, 1860: 40, (fig. 20), 1866: 362, and 1870: 395; Leffler, 1987: 9; Leng, 1902a: 144-145, (pl. III), 1902b: 131, 1908: 193, 1910a: 73, 80, 1912: 4, 8, 14, 1915: 560, and 1920: 40; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 92, (fig. 15); Leng and Mutchler, 1933: 9; Liard, 1979a: 16; Lindroth, 1954a: 300, 1954b: 365, and 1955: 18; Macgillivray and Houghton, 1902: 249; Maser and Beer, 1984: 48, (fig. 15); Mather, 1971: 21; Montgomery and Montgomery, 1931: 358; Notman, 1919: 92; Papp, H., 1952: 504; Pearson et al., 1997: 36; Pettit, 1869: 106; Popenoe, 1877: 22; Provancher, 1870: 222; Rivalier, 1954: 254, (fig. 2d); Rogers, R.V., 1880: 62, (fig. 10); Saunders, 1869: 13; Schaupp, 1878f: 56, and 1884a: 81, 94, (pl. 2, fig. 52; pl. 5, fig. 131); Schilder, 1953b: 563; Shelford, 1917: 1; Sherman, F., 1904: 29; Shoemaker and W.T. Davis, 1915: 157; Shook, 1984: 159; Skinner, 1909: 185; Slosson, 1895b: 279, and 1895c: 318; Smith, J.B., 1909: 197; Snow, 1877b: 16, and 1903: 192; Stevenson, 1904a: 73; Sumlin, 1976a: 103, (figs. 1, 2); Summers, 1873: 132; Tanner, V.M., 1927: 10, (figs. 194, 210, 213), 1928: 269, and 1929: 80; Taylor, 1886: 34; Valenti, 1986a: 5; Venables, 1913: 267; Wallis, 1961: 15, 57, 70, (pl. 3, figs. 51, 52); Werner, K., 1993: 72, (pl. 23, fig. 189); Wickham, 1894: 152, (fig. 15), 1906b: 43, and 1911: 5; Wiesner, 1992: 133; Willis, 1968: 314, 317, (fig. 29).

BIOLOGY: Acciavatti et al., 1992: 65; Acorn, 1991: 23, and 1992: 217; Altaba, 1991: 102; Blanchard, 1921: 397; Blatchley, 1910: 34; Boyd, 1978: 221; Cartwright, 1935: 71; Cooper, 1992: 6; Criddle, 1907: 112; Cutler, 1969a: 5, and 1969b: 14; Davis, W.T., 1914a: 74, and 1921: 111; Day, 1969: 8; Dimmock, 1883: 8; Freitag, 1972a: 21, 22; Freitag and Lee, 1972: 851; Freitag and Tropea, 1971: 54, 55; Frost, C.A., 1929: 219; Glaser, 1984: 73; Goldsmith, 1916: 447, 454, and 1919: 437, 444; Graves, 1963: 506; Graves and Brzoska, 1991: 20; Harrington, 1882b: 28; Johnson, W.N., 1975a: 21, 22, and 1975b: 34; Jones, 1884: 75; King, I.N., 1914: 319; Knisley and Hill, 1992: 133; Knisley and Schultz, 1997: 93, 132, (photo. 28); Knisley et al., 1987a: 282; Kritsky and Simon, 1995: 146; Kuster, 1978: 604, (figs. 1-7), 1979: 297, and 1980: 123; Kuster and W.G. Evans, 1980: 326; Landry, J.F., 1978: 14; Larochelle, 1972a: 8, 1973b: 59, 1974b: 18, 1974c: 33, 1974h: 100, 1975a: 2, 3, 1977b: 56, 1980b: 41, 1987a: 31, and 1987b: 53; Lawton, 1971b: 61, 62, 64-66, and 1972b: 47; Leng, 1902b: 133, 1902d: 238, and 1906: 56; Lindroth, 1963: 12, 22; May et al., 1986: 171; Meserve, 1936: 272; Moffat, 1877: 100; Morgan, K.R., 1985: 29; Nagano, 1980: 28; Nelson and LaBonte, 1989: 51; Niemelä and Ranta, 1993: 87; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 407, 412; Riley, 1877: 98; Rogers, L., 1974: 74; Roy, 1899: 87; Schaeffer, 1912: 203; Schaupp, 1878a: 2; Schincariol and Freitag, 1986: 333; Schultz, 1986: 146; Schultz and Hadley, 1987a: 363; Serrano and Yadov, 1984: 337; Shelford, 1911: 551, 1915b: 244, (figs. 18, 19), 291, (figs. 1, 5), and 1917: 1; Sherman, F., 1908: 361; Shook, 1981: 359; Smith, S.G., 1953: 33; Smith, S.G. and Edgar, 1954: 657; Smyth, 1905: 425-430, and 1908: 182-184; Stevens, 1909: 109; Sumlin, 1976a: 103; Townsend, 1884b: 227, and 1886: 47; Tucker, 1906: 10; Vaurie, 1950b: 153; Ward and Bowling, 1980: 31; Werner, K., 1993: 73, (pl. 24, fig. 197); Wickham, 1899b: 121, 1899d: 219, and 1906b: 43; Williams, J., 1879: 39; Willis, 1967: 145, 240, and 1970: 7, (fig. 23); Wilson, D.A., 1978: 15; Wilson, D.A. and Brower, 1983: 16, 31, (figs. 13, 14); Yadav et al., 1985: 5.

HABITAT: Clay, alkaline or otherwise, and sandy soil (Wallis, 1961: 57-59); sandy substrates (Kippenhan, 1994: 60).

tranquebarica vibex Horn, G.H., 1866: 395, fig. p. 395 (as species). OR: Fort Klamath; NT/ BC WA OR ID/MT CA NV/ WY.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1000).

SEX OF TYPE: M.

TAXONOMY: Beaulieu, 1900: 154; Blaisdell, 1892: 48; Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 61; Boyd et al., 1982: 10; Cazier, 1939a: 26; Dunn, G.W., 1891: 154; Fleutiaux, 1892: 93; Fuchs, 1904: 337; Harris, E.D., 1911: 19; Harris, E.D. and Leng, 1916: 6; Hatch, 1953: 39, (pl. III, fig. 9); Horn, W., 1903a: 185, 1915: 376, 1926: 271, 1930: 81, and 1938: 48, (pl. 73, figs. 18-20); Knowlton and Wood, 1946: 91; LaRivers, 1946: 136; Larochelle, 1977c: 68;

Leffler, 1979a: 577; Leffler and Pearson, 1976: 51; Leng, 1902a: 144, 145, (pl. III), 1918: 140, and 1920: 41; Maser and Beer, 1984: 48, (fig. 15); Rivalier, 1954: 254; Schaupp, 1884a: 81, 94, (pl. 2, figs. 53, 54); Schilder, 1953b: 563; Wallis, 1961: 59, (pl. 3, fig. 59); Ward, 1980: 61; Werner, K., 1993: 73, (pl. 24, fig. 197); Wickham, 1894: 153, and 1906b: 45; Wiesner, 1992: 134.

BIOLOGY: LaRivers, 1946: 135; Moore, I., 1937: 3; Wickham, 1899d: 219.

tranquebarica viridissima Fall, 1910: 89 (as variety of *C. vulgaris* Say). Southern CA: CA. A type specimen and one other specimen are deposited in MCZC.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: Sex and kind of type are in question.

TAXONOMY: Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 10; Harris, E.D., 1911: 68; Harris, E.D. and Leng, 1916: 6; Horn, W., 1915: 376, 1926: 272, and 1930: 81; Leng, 1920: 41; Nagano, 1982: 40; Werner, K., 1993: 73, (pl. 24, fig. 199); Wiesner, 1992: 134.

BIOLOGY: Huber, 1989: 12.

Subgenus CICINDELIDIA Rivalier

Cicindelidia Rivalier, 1954: 255 (as genus). Type-species: *Cicindela carthagena* Dejean (orig. des.).

TAXONOMY: Boyd et al., 1982: 10; Rivalier, 1954: 250, 255, 1963: 46, and 1971: 141; Vidal Sarmiento, 1966a: 253; Wiesner, 1992: 137.

abdominalis Fabricius, 1801: 237 (as species). Carolina; NY PA NJ/ LA MS AL GA SC NC FL.

ventralis Newman, 1838: 414 (as species; preoccupied Dejean, 1825: 32). Eastern FL: St. John's Bluff.

faceta Casey, 1913: 38 (as subspecies of *C. abdominalis* Fabricius). Possibly NJ.

TYPE DEPOSITORY: USNM (type no. 45969).

SEX OF TYPE: F.

IMMATURE STAGES: Hamilton, C.C., 1925: 19, 44, (figs. 72, 109, 139); Spangler, P.J., 1955: 84; Valenti, 1996b: 46.

TAXONOMY: Bousquet and Larochelle, 1993: 62; Boyd, 1973: 7, and 1978: 198, 223, (fig. 14); Boyd et al., 1982: 12; Chaudoir, 1865: 29; Choate, 1975: 73, and 1984: 75, (figs. 2, 5); Ciegler, 1997: 180, 186, (fig. 17); Cresson, 1861: 9; Davis, W.T., 1909: 96, 1914b: 63, 1914d: 336, 1918a: 48, and 1918d: 33; Dejean, 1825: 140; Downie and Arnett, 1996: 79, 83, (fig. 3.17); Dozier, 1918: 296; Fall, 1895: 179; Fattig, 1935: 154; Fleutiaux, 1892: 66; Gemminger and Harold, 1868: 9; Glaser, 1984: 66, 67; Graves and Pearson, 1973: 160, 162, 178, (fig. 39); Harris, E.D., 1911: 41; Harris, E.D. and Leng, 1916: 11; Harris, T.W., 1852: 1, (fig. 1); Hoffman, 1991: 176; Horn, G.H., 1892: 27; Horn, W., 1915: 384, 385, 1926: 285, 1930: 84, and 1938: 50, (pl. 78, fig. 1); Huber, 1969a: 22, and 1986: 56; Kirk, 1969: 7, and 1970: 8; Knisley and Schultz, 1997: 91, 98, (photo. 3); Larochelle, 1977c: 66-72, 1986c: 34-48, and 1987b: 52; Lawton, 1970b: 1, 4, 6, 7; LeConte, 1848: 183, 1860: 57, (fig. 54), and 1875: 160; Leng, 1902a: 117, 180, 1902b: 131, 1902d: 236, 1912a: 15, and 1920: 41, 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 95, (fig. 26); Löding, 1910: 131; Mather, 1971: 22; Papp, II., 1952: 501; Pearson et al., 1997: 36; Rivalier, 1954: 257; Robinson and Murray, 1980: 27; Say, 1818: 425; Schaupp, 1884a: 84, 108, (pl. 4, fig. 115); Schilder, 1953b: 559; Sherman, F., 1904: 32; Slosson, 1893: 147; Smith, J.B., 1909: 198; Valenti, 1986a: 1; Weeks, 1905: 342; Wiesner, 1992: 141; Willis, 1968: 306.

REDESCRIPTION: Choate, 1984: 75; Graves and Pearson, 1973: 178; Leng, 1902a: 180, (pl. II).

BIOLOGY: Boyd, 1978: 223; Cartwright, 1935: 74; Choate, 1975: 73; Cresson, 1861: 9; Graves and Pearson, 1973: 178; Johnson, W.N., 1972: 19, 20; Knisley and Hill, 1992: 133; Knisley and Schultz, 1997: 91, 98, (photo. 3); Kritsky and Simon, 1995: 144; Leng, 1902a: 180, 1902b: 134, 136, 1902c: 239, and 1915: 562; Liebeck, 1890: 160; Pearson et al., 1988: 413; Wickham, 1899d: 228; Wilson, D.A., 1975: 49.

HABITAT: Pine forests along seldom used sandy roads and paths, in partly shaded locations (Graves and Pearson, 1973: 178).

amargosae amargosae Dahl, 1939: 221 (as subspecies of *C. willistoni* LeConte). CA: Inyo Co., Death Valley, 4 mi. N. of Furnace Cr.; CA NV. An allotype is deposited in CASC, and two paratypes in IPZE.

TYPE DEPOSITORY: CASC (type no. 8152).
SEX OF TYPE: M.
IMMATURE STAGES: Leffler, 1979a: 86; Valenti, 1996b: 48.
TAXONOMY: Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 10; Dahl, 1940: 79; Kippenhan, 1995b: 56; Larochelle, 1986a: 13, and 1987b: 52; Leffler, 1987: 8; Pearson et al., 1997: 36; Rumpp, 1956a: 131; Schilder, 1953b: 563; Wiesner, 1992: 137; Willis, 1967: 294, and 1968: 317.
BIOLOGY: LaRivers, 1946: 138.
HABITAT: Salt flat near Furnace Creek (Dahl, 1939: 222).

amargosae nyensis Rumpp, 1956a: 140 (as subspecies of *C. amargosae* Dahl). NV: Nye Co., 1.6 mi. S. of Springdale; OR/ CA NV. Two paratypes (no. 7282) are deposited in CNCI (de Ruette, 1970: 30).

TYPE DEPOSITORY: CASC.
SEX OF TYPE: M.
TAXONOMY: Beer and Maser, 1973: 33; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 10; Leffler, 1979a: 523, and 1987: 8; Maser and Beer, 1984: 48, (fig. 21); Valenti, 1986a: 4; Wiesner, 1992: 137.
HABITAT: Open wet areas of mud, dispersed through alkaline soils; also short distances from lakeshores, where soil may be wet but not muddy (Beer and Maser, 1973: 33).

cazieri Vogt, 1949: 6 (as species). TX: Starr Co., 10 mi. N. of Rio Grande City; TX.

TYPE DEPOSITORY: USNM (type no. 59057).
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 12; Erwin and House, 1978: 236; Gage, 1991b: 2, (figs. a-g); Larochelle, 1987b: 58; Murray and Acciavatti, 1976: 1; Pearson et al., 1997: 36; Sumlin, 1976b: 521; Wiesner, 1992: 142.
BIOLOGY: Huber, 1989: 12.
HABITAT: Along edges and dirt side roads of highway heading to Roberson (Vogt, 1949: 7).

fera Chevrolat, 1834: fasc. 2, sp. no. 2 (as species). Mexico; AZ NM: Mex.
temulineata Audouin and Brullé, 1839: 128 (as species). Mexico.

TAXONOMY: Acciavatti et al., 1979: 31; Bates, 1881: 10, and 1890: 506; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 12; Cazier, 1954: 257, (figs. 11, 57, 156); Cresson, 1861: 12; Fleutiaux, 1892: 89; Gemminger and Harold, 1868: 15; Harris, E.D., 1911: 46; Harris, E.D. and Leng, 1916: 10; Horn, W., 1903b: 218, 1915: 384, 1926: 284, and 1938: 50, (pl. 77, fig. 21); Horn, W. et al., 1897: 179; Larochelle, 1989a: 23; Murray, 1979: 52; Pearson et al., 1997: 36; Rivalier, 1954: 257; Rumpp, 1956b: 55; Schilder, 1953b: 558; Vaurie and Vaurie, 1953: 87; Wiesner, 1992: 141.
BIOLOGY: Larochelle, 1989a: 23; Murray, 1979: 52.
HABITAT: Sandy banks of streams, and along seashore (Cazier, 1954: 258).

haemorrhagica arizonae Wickham, 1899d: 226 (as variety of *C. sedecimpunctata* Klug). AZ: Colorado River Canyon; NV/ UT/ AZ.

TYPE DEPOSITORY: USNM (type no. 56137).
SEX OF TYPE: M.
TAXONOMY: Bertholf, 1983: 7, 10; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 13; Casey, 1911: 253; Engelhardt, 1917: 46, and 1918: 230; Erwin and House, 1978: 237; Harris, E.D., 1911: 45; Harris, E.D. and Leng, 1916: 13; Horn, W., 1902b: 385, 1903a: 182, 193, 1915: 388, 1926: 290, 1930: 84, and 1938: 50, (pl. 80, fig. 3); Larochelle, 1986c: 38, and 1987b: 54; Leng, 1902a: 176, 178, and 1920: 42; Rivalier, 1954: 257; Schilder, 1953b: 560; Tanner, V.M., 1927: 10, (figs. 203, 216), and 1929: 86; Wiesner, 1992: 145.

haemorrhagica haemorrhagica LeConte, 1851: 171 (as species; the established junior name *haemorrhagica* is here retained, in place of the rare senior name *hemorrhagica*, for reasons of nomenclatural stability). CA: San Diego; WA OR ID/ CA NV/ WY UT CO/ AZ NM.

TYPE DEPOSITORY: MCZC.

bisignata Dokhtouroff, 1883a: 12 (as species). CA.

pacifica Schaupp, 1884a: 84, 106, pl. 4, fig. 110 (as variety of *C. haemorrhagica* LeConte). CA: San Diego.

nigroides Hatch, 1938: 236 (as variety of *C. haemorrhagica* LeConte). WA: Walla Walla Co., Walla Walla.

IMMATURE STAGES: Knisley, 1987: 1191; Knisley and Juliano, 1988: 1983; Knisley and Pearson, 1984: 465, 533, (figs. 86-91); Leffler, 1979a: 87; Leffler and Pearson, 1976: 55; Valenti, 1996b: 48, 49.

TAXONOMY: Bates, 1881: 9; Bertholf, 1983: 7, 9, (fig. 5); Blaisdell, 1892: 49, and 1925: 81; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 13; Cazier, 1948: 11, and 1954: 282, (figs. 92, 190); Chaudoir, 1865: 30; Cresson, 1861: 13; Davis, A.C., 1931: 187; Dunn, G.W., 1891: 154; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 66, 71; Gemminger and Harold, 1868: 17; Harris, E.D., 1911: 44, 45; Harris, E.D. and Leng, 1916: 13; Hatch, 1938: 236, (fig. 18), and 1953: 42, (pl. III, fig. 18); Horn, G.H., 1866: 397, 1892: 27, (fig. 13), and 1894: 306; Horn, W., 1893: 336, 1903a: 194, 1915: 388, 1926: 289, 290, 1930: 84, and 1938: 50, (pl. 79, figs. 27, 28; pl. 80, figs. 1, 2); Horn, W. et al., 1897: 179; Hubbard, 1891: 226; Ingram, 1934: 51; Kippenhan, 1990a: 312, and 1994: 22, 71, (fig. 48); Knaus, 1902: 151, and 1922: 194, 195; LaRivers, 1946: 139; Larochelle, 1986c: 42, 47, 1987a: 28, and 1987b: 52; LaRue, 1994b: 1; LeConte, 1858: 27, 1860: 55, (fig. 49), and 1861a: 335; Leffler, 1979a: 541; Leffler and Pearson, 1976: 54; Leng, 1902a: 176, 178, and 1920: 42; Maser and Beer, 1984: 48, (fig. 18); Nagano, 1982: 39; Nagano et al., 1982: 339, and 1985: 109; Pearson et al., 1997: 36; Rivalier, 1954: 257; Rumpp, 1956a: 131; Schaeffer, 1906: 234; Schaupp, 1884a: 84, 105, (pl. 4, figs. 108-110); Schilder, 1953b: 560; Shook, 1984: 159; Sumlin, 1976a: 105; Tanner, V.M., 1929: 86, and 1951: 49; Wiesner, 1992: 145; Willis, 1968: 307.

REDESCRIPTION: Leng, 1902a: 176, (pl. IV); Rumpp, 1956a: 134; Schaupp, 1884a: 105.

BIOLOGY: Blaisdell, 1892: 49, and 1925: 81; Cazier, 1954: 282, (pl. 92, fig. 190); Freitag and Tropea, 1971: 54; Frick, 1957: 503; Horn, G.H., 1876b: 241; Ingram, 1934: 51; Johnson, W.N., 1975a: 22; Kritsky and Simon, 1995: 146; LaRivers, 1946: 139; Larochelle, 1974c: 26, and 1977b: 52; LaRue, 1990: 51; Lawton, 1972b: 35, 43, 44; Lawton and Willis, 1974: 51; Leffler, 1975: 26, 30; Leffler and Pearson, 1976: 55; Leng, 1902a: 178; Moore, I., 1937: 3; Nagano, 1980: 28, and 1982: 39; Pearson, 1985: 68; Pearson and Juliano, 1991: 225; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 250; Pearson and Mury Meyer, 1979: 563; Pearson et al., 1988: 407, 410; Richman, 1967: 89; Shelly and Pearson, 1978: 791; Smyth, 1908: 181-187; Wickham, 1899d: 226, and 1904b: 651; Willis and Stamatov, 1971: 44.

HABITAT: Moist, saline soils of much of Columbia Basin (Leffler and Pearson, 1976: 55); dark sand or clay soils, along ocean beaches, alkaline flats between patches of maritime vegetation; waterside (Wickham, 1899d: 226).

haemorrhagica woodgatei Casey, 1913: 40 (as species). NM: Jemez Springs; CA/ AZ NM TX; Mex.

TYPE DEPOSITORY: USNM.

nevadiana Casey, 1924: 16 (as variety of *C. pacifica* Schaupp). NV: Las Vegas.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

TAXONOMY: Bates, 1881: 9; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 13; Cazier, 1948: 11, and 1954: 282; Harris, E.D. and Leng, 1916: 13; Horn, W., 1903b: 214, 218, 1915: 388, 1926: 289, 290, and 1930: 84; Hutchings, 1986: 3; Leng, 1918: 140, and 1920: 42; Leng and Mutchler, 1927: 7; Schilder, 1953b: 560; Wiesner, 1992: 145.

BIOLOGY: Johnson, W.N., 1975b: 35, and 1978a: 29.

HABITAT: Perimeter of wet sink and wash running down to sink; both sides of highway in roadside ditches around a small pond; wet irrigated pasture; sandy perimeter of manmade lake (Lawton and Willis, 1974: 57, 58).

highlandensis Choate, 1984: 74, figs. 1, 4A, B (as species). FL: Highlands Co., S. of Josephine Creek; FL.

TYPE DEPOSITORY: FSCA.
SEX OF TYPE: F.
TAXONOMY: Bousquet and Larochelle, 1993: 62; Pearson et al., 1997: 36; Wiesner, 1992: 141.
HABITAT: On fossil sand dunes (Choate, 1984: 75).

hornii hornii Schaupp, 1884a: 80, 88, pl. 1, fig. 22 (as species; replacement name for *C. anthracina* Horn, G.H.). NM: Fort Bayard; AZ NM TX; Mex.

anthracina Horn, G.H., 1880: 139 (as species; preoccupied Klug, 1834: 28). NM: Ft. Bayard.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1002.2).
SEX OF TYPE: F.

ritteri Bates, 1890: 496 (as species). Villa Lerdo in Durango.

TYPE DEPOSITORY: BMNH.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 511, (figs. 44-49); Valenti, 1996b: 49.
TAXONOMY: Acciavatti et al., 1979: 31; Bertholf, 1983: 8, 11, (fig. 7); Blackwelder, 1944: 18; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 11; Cazier, 1954: 247, (fig. 4); Engelhardt, 1932: 212; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 95; Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 34; Harris, E.D. and Leng, 1916: 9; Horn, W., 1893: 340, 1900a: 116, 1903a: 181, 193, 1903b: 214, 216, 1915: 382, 1926: 281, 1930: 83, and 1938: 49, (pl. 76, fig. 8); Horn, W. et al., 1897: 168; Huber, 1969b: 26, and 1986: 55; Knisley and Pearson, 1984: 511; Leng, 1902a: 115, 126, 127, and 1920: 41; Pearson et al., 1997: 36; Rivalier, 1954: 256; Schilder, 1953b: 558; Ward, 1980: 60; Wiesner, 1992: 139; Willis, 1968: 310.
REDESCRIPTION: Leng, 1902a: 127.
BIOLOGY: Johnson, W.N., 1975b: 35; Pearson, 1985: 70, and 1988: 135; Pearson and Juliano, 1991: 224; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson and Mury Meyer, 1979: 56; Pearson and Stemberger, 1980: 374; Pearson et al., 1988: 413; Schultz and Hadley, 1987b: 737; Smyth, 1908: 188; Wickham, 1900a: 82.
HABITAT: Dry areas on hillsides or mesas where soil is rocky or loamy and covered with grasses of various types; prefers to rest beneath clumps of grass (Cazier, 1954: 247; Lawton and Willis, 1974: 58).

marginipennis Dejean, 1831: 260 (as species). North America; IN OH/ NY PA NJ WV/ NH VT/ MS.

IMMATURE STAGES: Schaupp, 1879b: 23.
TAXONOMY: Acciavatti et al., 1992: 53, 70, (fig. 14); Blatchley, 1910: 31; Bousquet and Larochelle, 1993: 62; Boyd, 1978: 198, 225, (fig. 16); Boyd et al., 1982: 13; Chaudoir, 1865: 30; Cresson, 1861: 15; Davis, W.T., 1917c: 137; Dejean, 1837: 5; Downie and Arnett, 1996: 79, 83, (fig. 3.19); Dunn, G.A., 1986b: 30; Edwards, J.G., 1949: 73; Fleutiaux, 1892: 61; Gemminger and Harold, 1868: 21; Glaser, 1984: 66, 67; Graves and Brzoska, 1991: 4, 5, 24, (fig. 28); Graves and Pearson, 1973: 160, 162, 181, (fig. 18); Greene, 1914a: 89; Harris, E.D., 1911: 43; Harris, E.D. and Leng, 1916: 13; Horn, G.H., 1892: 27, (fig. 10); Horn, W., 1915: 387, 1926: 289, 1930: 84, and 1938: 50, (pl. 79, fig. 18); Knisley et al., 1987a: 281, 282; Kritsky et al., 1996: 29; Larochelle, 1977c: 68, 1986c: 36, 45, and 1987b: 57; LeConte, 1848: 182, 1860: 57, (fig. 55), and 1875: 160; Leng, 1902a: 117, 178, 1912: 9, 14, 1919: 238, and 1920: 41; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 95, (fig. 27); Liebeck, 1890: 160; Mather, 1971: 22; Pearson et al., 1997: 36; Rivalier, 1954: 257; Schaupp, 1878c: 20, and 1884a: 84, 107, (pl. 4, fig. 107); Schilder, 1953b: 560; Smith, J.B., 1909: 198; Wiesner, 1992: 144; Willis, 1968: 306.
REDESCRIPTION: Leng, 1902a: 178, (pl. IV).
BIOLOGY: Acciavatti et al., 1992: 70; Blatchley, 1910: 36; Boyd, 1978: 225; Dunn, G.A., 1978: 2, 1981a: 5, (fig. 9), and 1982: 1; Dunn, G.A. and D.A. Wilson, 1979: 49; Glaser, 1984: 66, 67; Graves and Brzoska, 1991: 24; Graves and Pearson, 1973: 181; Huber, 1989: 12; Knisley et al., 1987a: 281; Tanner, O., 1988: 9; Wickham, 1899d: 227.
HABITAT: Sand or cobblestones of riverbanks or bars (Leng, 1902a: 179; Stamatov, 1970: 11).

nigrocoerulea bowditchi Leng, 1902a: 124, pl. IV (as species). CO: vicinity of Durango; CO/ AZ NM.

TYPE DEPOSITORY: MCZC (cotype).

TAXONOMY: Acciavatti et al., 1979: 31; Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 11; Dahl, 1941: 190; Horn, W., 1903a: 181, 192, 1915: 382, 1926: 281, 1930: 83, and 1938: (pl. 76, figs. 4, 5); Kippenhan, 1990a: 311, and 1994: 62; Leng, 1902a: 115, 124, and 1920: 41; Schilder, 1953b: 558; Wiesner, 1992: 138.

BIOLOGY: Johnson, W.N., 1977: 18; Rumpp, 1961: 170.

nigrocoerulea nigrocoerulea LeConte, 1848: 181 (as species). Near the Arkansas River; CA/ UT CO/ KS/ AZ NM TX OK; Mex.

TYPE DEPOSITORY: MCZC (2 types).

robusta Leng, 1902a: 124 (as species). TX: Alpine.

TYPE DEPOSITORY: AMNH (lectotype).

SEX OF TYPE: F.

feminalis Casey, 1909: 269 (as subspecies of *C. nigrocoerulea* LeConte). CO: Las Animas.

TYPE DEPOSITORY: USNM (type no. 45906).

snowi Casey, 1909: 269 (as species). AZ: Congress Junction.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

triplicans Casey, 1909: 270 (as subspecies of *C. snowi* Casey). CO: Robinson.

TYPE DEPOSITORY: USNM (type no. 45907).

SEX OF TYPE: M.

velutoidea Casey, 1909: 270 (as subspecies of *C. snowi* Casey). Unrecorded locality, but probably from Colorado.

TYPE DEPOSITORY: USNM (type no. 45909).

SEX OF TYPE: M.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 528, (figs. 74-79); Valenti, 1996b: 49.

TAXONOMY: Acciavatti et al., 1979: 31; Bertholf, 1983: 8, 15, (fig. 4); Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 62; Boyd et al., 1982: 10; Cazier, 1954: 246, (figs. 3, 38, 138), and 1960: 7, (fig. 3); Cresson, 1861: 15; Dahl, 1941: 190; Fall and Cockerell, 1907: 154; Fleutiaux, 1892: 97; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 22; Harris, E.D., 1911: 33; Harris, E.D. and Leng, 1916: 9; Horn W., 1903a: 181, 192, 1915: 381, 1926: 280, 281, 1930: 83, and 1938: 49, (pl. 76, figs. 2, 3); Horn, W. et al., 1897: 167; Hutchings, 1986: 3; Kippenhan, 1990a: 311, and 1994: 23, 62, (fig. 43); Knaus, 1906b: 329; Larochelle, 1977b: 54, and 1977c: 70; LaRue, 1990: 49, 1994a: 25, and 1994b: 1; LeConte, 1860: 35, (fig. 10), and 1866: 362; Leng, 1902a: 115, 123, 1918: 140, and 1920: 41; Pearson et al., 1997: 37; Rivalier, 1954: 256; Schaupp, 1884a: 79, 88, (pl. 1, fig. 23); Schilder, 1953b: 558; Sumlin, 1991b: 20; Tanner, V.M., 1927: 10, (figs. 189, 221), and 1929: 85; Wiesner, 1992: 138; Willis, 1968: 310.

REDESCRIPTION: Leng, 1902a: 123.

BIOLOGY: Gaumer, 1973: 14; Johnson, W.N., 1975a: 23, 1975b: 35, 1977: 18, 19, and 1978a: 29, 30; Knisley, 1984: 93; Kritsky and Simon, 1995: 144, (figs. 3, 4, 7); Lantz, 1905: 254; Larochelle, 1973b: 58, 1977b: 54, and 1984: 57; LaRue, 1990: 49; Lawton and Willis, 1974: 56-58, 62; Pearson, 1985: 70; Pearson and Cassola, 1992: 380; Pearson and Juliano, 1991: 224; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson and Mury Meyer, 1979: 561; Pearson and Stemberger, 1980: 374; Pearson et al., 1988: 407, 413; Rumpp, 1962: 170; Smyth, 1905: 428-431, 1908: 187, and 1934: 102; Wickham, 1900a: 81; Willis, 1970: 4; Willis and Stamatov, 1971: 47.

HABITAT: Dry areas, open places in woods, along roads, in dry ditches (Cazier, 1954: 246).

nigrocoerulea subtropica Vogt, 1949: 2 (as subspecies of *C. nigrocoerulea* LeConte). TX: southwestern Hidalgo Co.; TX; Mex. One paratype (no. 4079) is deposited in SEMC.

TYPE DEPOSITORY: USNM (type no. 59055).

SEX OF TYPE: F.

TAXONOMY: Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 11; Byers and Karren, 1968: 3; Cazier, 1954: 246; Erwin and House, 1978: 236; Gage and Sumlin, 1986: 203; Larochelle,

1987b: 58; Schilder, 1953b: 558; Weisner, 1992: 138.
BIOLOGY: Gage and Sumlin, 1986: 203; Huber, 1989: 12.
HABITAT: Open places along little roadways, mesquite forest land (Vogt, 1949: 3).

obsoleta neojuvenilis Vogt, 1949: 4 (as subspecies of *C. obsoleta* Say). TX: southwestern Hidalgo Co., 5 mi. SW. of Mission: TX; Mex?
TYPE DEPOSITORY: USNM (type no. 59056).
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 11; Cazier, 1954: 250; Erwin and House, 1978: 236; Larochelle, 1987b: 58; Murray, 1979: 50; Schilder, 1953b: 558; Wiesner, 1992: 139; Willis, 1968: 311.
BIOLOGY: Huber, 1989: 12; Murray, 1979: 50.
HABITAT: Lonely roadways, edges of cultivated fields and in clearings; associated with mesquite forest land, along alluvial floodplain of Rio Grande (Vogt, 1949: 5).

obsoleta obsoleta Say, 1823: 143 (as species). Missouri Territory; banks of the Arkansas R. near the mountains; CO/ KS/ NM TX OK.
prasina LeConte, 1860: 31 (as unnamed variety of *C. obsoleta* Say, LeConte, 1848: 178; as species LeConte, 1860: 31). Arkansas River below Bent's Fort.
TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Drew and Van Cleave, 1961: 106, 111; Hamilton, C.C., 1925: 19, 51, (figs. 158, 169, 179); Valenti, 1996b: 47, 49.
TAXONOMY: Acciavatti et al., 1979: 31; Bates, 1884: 256; Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 11; Cazier, 1954: 249; Cresson, 1861: 15; Drew and Van Cleave, 1961: 104, 111; Engelhardt, 1932: 212; Fall and Cockerell, 1907: 154; Fleutiaux, 1892: 114; Gemminger and Harold, 1868: 23; Graves and Pearson, 1973: 159, 163, 177, (fig. 14); Harris, E.D., 1911: 34, 35; Harris, E.D. and Leng, 1916: 9; Horn, G.H., 1892: 27; Horn, W., 1903b: 216, 1915: 382, 1926: 281, 282, 1930: 83, and 1938: 49, (pl. 76, figs. 13, 18); Horn, W. et al., 1897: 168; Kippenhan, 1990a: 312, 1991: 11, (fig. 1), and 1994: 23, 65, 66, (fig. 45); Knaus, 1900a: 110; LeConte, 1848: 178, and 1860: 31, 32, (fig. 2); Leng, 1902a: 115, 118, (pl. 2), and 1920: 41; Mandl, 1960: 279; Murray, 1979: 50; Pearson et al., 1997: 37; Popenoe, 1877: 22; Rivalier, 1954: 257; Schaeffer, 1908: 53; Schaupp, 1884a: 79, 86, (pl. 1, figs. 15, 16); Schilder, 1953b: 558; Townsend, 1895: 39; Valenti, 1986a: 3; Wiesner, 1992: 139; Willis, 1968: 311, and 1970: 5, (fig. 15).
REDESCRIPTION: Schaupp, 1884a: 86.
BIOLOGY: Cazier, 1954: 249; Drew and Van Cleave, 1961: 111; Engelhardt, 1932: 212; Gaumer, 1969: 8; Graves and Pearson, 1973: 177; Johnson, W.N., 1975b: 34, 1977: 18, 19, and 1978a: 28; Knisley, 1984: 93; Kritsky and Simon, 1995: 146; Lantz, 1905: 254; Larochelle, 1987a: 32, and 1987b: 54, 58; Lavigne, 1972: 1, 3; Lawton and Willis, 1974: 62; Pearson, 1988: 131; Rogers, L., 1974: 73; Schultz, 1986: 143, (fig. 1); Smyth, 1905: 428; Spangler, H.G., 1988: 450; Wickham, 1899d: 210, and 1900: 81; Willis, 1970: 5.
HABITAT: Prairies, roads, bare areas in short vegetation, grassy meadows, hillsides, pastures near bays, parks, bayous, moist ditches and open areas above creeks (Graves and Pearson, 1973: 249).

obsoleta santaclarae Bates, 1890: 493 (as variety or race of *C. obsoleta* Say). Santa Clara in Chihuahua; CO/ AZ NM; Mex.
anita Dow, 1911: 271 (as variety of *C. vulturina* LeConte). NM: Ft. Wingate.
TYPE DEPOSITORY: AMNH (syntypes).

IMMATURE STAGES: Knisley, 1987: 1191; Knisley and Juliano, 1988: 1983; Knisley and Pearson, 1984: 465, 505, (figs. 32-37); Knisley et al., 1989: 179.
TAXONOMY: Acciavatti et al., 1979: 31; Angell, 1928: 111; Bertholf, 1983: 8, 16, (fig. 15); Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 11; Cazier, 1954: 250, 251, (figs. 47, 145); Fleutiaux, 1892: 114; Grossbeck, 1910: 97; Harris, E.D., 1911: 34, 35, 65; Harris, E.D. and Leng, 1916: 9; Horn, W., 1892b: 98, 1903a: 182-192, 1903b: 216, 1915: 382, 1926: 282, 1930: 83, 84, and 1938: 49, (pl. 76, figs. 19-23); Horn, W. et al., 1897: 169; Kippenhan, 1990a: 312, and 1994: 65, 66, (fig. 46); Larochelle, 1977c: 68-71, and 1986c: 33, 38, 47; Leng, 1902a: 118, 119, and

1920: 41; Mandl, 1960: 279; Rivalier, 1954: 257; Schaeffer, 1906: 234; Schilder, 1953b: 558; Skinner, 1907: 457; Wiesner, 1992: 139.

BIOLOGY: Dow, 1913: 164; Hadley and Schultz, 1987: 677; Johnson, W.N., 1975b: 35, and 1978a: 29; Larochelle, 1974c: 28, and 1985: 68; Lawton and Willis, 1974: 55, 58, 59; Pearson, 1985: 67; Pearson and Juliano, 1991: 224; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 251; Pearson and Mury Meyer, 1979: 560; Pearson and Stemberger, 1980: 374; Pearson et al., 1988: 413; Rumpp, 1962: 171; Smyth, 1908: 188, and 1934: 102.

HABITAT: Higher elevations in meadows, grasslands and pastures among short grass (Cazier, 1954: 251).

obsoleta vulturina LeConte, 1853: 439 (as species). TX: Eagle Pass; NM TX OK/ AR LA; Mex.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 11; Cazier, 1954: 249, (figs. 45, 144); Cresson, 1861: 20; Drew and Van Cleave, 1961: 111; Fall and Cockerell, 1907: 154; Fleutiaux, 1892: 114; Gaumer, 1969a: 8, 12, (figs. 12, 13); Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 117; Haimbach, 1907: 248; Harris, E.D., 1911: 34; Harris, E.D. and Leng, 1916: 9; Horn, G.H., 1866: 396; Horn, W., 1903a: 182, 185, 1915: 382, 1926: 282, 1930: 83, and 1938: 49, (pl. 76, figs. 14-17); Larochelle, 1977c: 68; LeConte, 1858: 27, and 1860: 32, (fig. 3); Leng, 1902a: 118, (pl. III), and 1920: 41; Rivalier, 1954: 257; Schaupp, 1884a: 86, (pl. 1, fig. 17; pl. 5, fig. 125); Schilder, 1953b: 558; Wiesner, 1992: 139.

BIOLOGY: Lawton and Willis, 1974: 62-64; Leng, 1902a: 118, (pl. III); Schultz, 1989: 468; Smyth, 1908: 188; Wickham, 1899d: 210.

HABITAT: Broad flats of bottom lands used as pasture, dry spots beside clumps of bunch grass, roads and prairies, bare ground (Leng, 1902a: 118).

ocellata ocellata Klug, 1834: 33 (as species; resurrected name). Jalapa, Veracruz.; AZ NM; Mex., C. Amer.

flavopunctata Chevrolat, 1834: fasc. 2, sp. no. 2 (as species; preoccupied Audouin, 1832: pl. 18). Mexico.

incerta Chevrolat, 1835: fasc. 6, sp. no. 12 (as species). Mexico.

humeralis Chevrolat, 1841: 13 (as species). Mexico.

chiapana Bates, 1890: 505 (as subspecies of *C. flavopunctata* Chevrolat). Tapachula, Chiapas.

TYPE DEPOSITORY: IPZE (syntypes).

IMMATURE STAGES: Knisley, 1987: 1191; Knisley and Juliano, 1988: 1983; Knisley and Pearson, 1984: 465, 536, (figs. 92-97); Valenti, 1996b: 49.

TAXONOMY: Bates, 1881: 10, and 1890: 505; Bertholf, 1983: 7, 16, (fig. 16); Blackwelder, 1944: 18; Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 13; Cazier, 1954: 275-277, (figs. 18, 86, 183); Chaudoir, 1865: 30; Cresson, 1861: 12, 15; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 72; Freitag, 1966: 942, (figs. 4, 12, 19, 23, 24); Gemminger and Harold, 1868: 15; Graves and Pearson, 1973: 160, 180, (fig. 17); Harris, E.D., 1911: 42-43; Harris, E.D. and Leng, 1916: 12; Horn, W., 1902a: 231, 1903a: 193, 1903b: 214, 217, 221, 1915: 31, (fig. 83), 387, 1926: 288, 304, 1930: 84, and 1938: 50, (pl. 79, figs. 13-16); Horn, W. et al., 1897: 177; Huber, 1969a: 20, and 1986: 56; Hutchings, 1986: 3, 4; Knaus, 1906a: 145, and 1906b: 329; Larochelle, 1987a: 24, 29; LeConte, 1860: 54; Leng, 1920: 42; Mandl, 1960: 279, and 1961a: 26; Murray, 1979: 53; Pearson et al., 1997: 37; Rivalier, 1954: 257; Rotger, 1975: 77; Schilder, 1953a: 314, and 1953b: 559; Vaurie and Vaurie, 1953: 87; Wiesner, 1992: 144; Willis, 1968: 306.

BIOLOGY: Graves and Pearson, 1973: 180; Johnson, W.N., 1975a: 23, 1975b: 35, 1977: 18, and 1978a: 29; Klopp, 1974: 14; Knaus, 1906: 147; Larochelle, 1973b: 58, 1974c: 29, and 1977b: 54; Lawton and Willis, 1974: 56, 57; Murray, 1979: 53; Pearson, 1985: 67, and 1988: 128; Pearson and Juliano, 1991: 225; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 252; Pearson and Mury Meyer, 1979: 558, (fig. 1); Pearson et al., 1988: 408, 413; Shelly and Pearson, 1978: 791.

HABITAT: Sandy areas around lakes and ponds, banks of streams, ditches, cattle watering tanks, irrigated fields, and moist pastures (Cazier, 1954: 276).

ocellata rectilatera Chaudoir, 1843: 693 (as species). Mexico; NM TX/ LA; Mex.

IMMATURE STAGES: Hamilton, C.C., 1925: 19, 42, (figs. 70, 107, 137); Valenti, 1996b: 47.

TAXONOMY: Acciavatti et al., 1979: 31; Bates, 1881: 10, 1884: 260, and 1890: 505; Blackwelder, 1944: 18; Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 13; Cazier, 1954: 278; Cresson, 1861: 12, 15; Fall, 1895: 179; Fleutiaux, 1892: 69, 70; Gaumer, 1969a: 8, 12, (fig. 9); Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 25; Graves and Pearson, 1973: 160, 162, 180, (fig. 17); Harris, E.D., 1911: 43; Harris, E.D. and Leng, 1916: 12; Horn, W., 1903b: 217, 218, 1915: 387, 1926: 288, 1930: 84, and 1938: 50, (pl. 79, fig. 17); Horn, W. et al., 1897: 177; Huber, 1986: 56; Hutchings, 1986: 3, 4; Larochelle, 1977c: 73, 1980b: 40, and 1980c: 47; LeConte, 1860: 54, (fig. 48), and 1866: 363; Leng, 1920: 42; Murray, 1979: 53; Papp, H., 1952: 502; Rivalier, 1954: 257; Schaupp, 1884a: 82, 97, (pl. 3, fig. 75); Schilder, 1953b: 559; Valenti, 1986a: 3; Wickham, 1898a: 22; Wiesner, 1992: 144.

REDESCRIPTION: Leng, 1902a: 158, (pl. IV).

BIOLOGY: Freitag and Tropea, 1971: 54; Gaumer, 1973: 15; Ideker, 1980: 43; Johnson, W.N., 1972: 20, 1975a: 23, 24, and 1977: 18, 19; Knaus, 1906: 147; Larochelle, 1975a: 2, and 1977b: 54; Lawton, 1972b: 44, 45; Lawton and Willis, 1974: 60-64; Leng, 1902a: 116, 158; Mitchell, 1902: 109; Murray, 1979: 53; Pearson et al., 1988: 413; Robinson, 1975: 36; Rumpp, 1962: 171; Schultz, 1981: 48, and 1989: 470; Smyth, 1908: 185; Wickham, 1899d: 220, and 1900a: 82; Wilson, D.A., 1975: 45, 49.

HABITAT: River bars, sandy banks and road pools (Wickham, 1899d: 220).

politula barbaraannae Sumlin, 1976b: 523, fig. 3 (as subspecies of *C. politula* LeConte). TX: Hudspeth Co., Hueco Mts.; TX.

TYPE DEPOSITORY: CASC (type no. 13147).

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 12; Gage, 1988: 146; Larochelle, 1985: 68; Sumlin, 1985: 220, 223, (fig. 5); Wiesner, 1992: 142.

BIOLOGY: Huber, 1989: 12.

HABITAT: Large exposed ledges of limestone at elevations of 5,000 ft. or higher (Sumlin, 1976b: 523).

politula laetipennis Horn, W., 1913b: 32 (as subspecies of *C. politula* LeConte). Mex.: Coahuila, Saltillo; TX?; Mex.

TAXONOMY: Benedict, 1934: 76; Blackwelder, 1939: 8; Boyd et al., 1982: 12; Cazier, 1954: 264, (figs. 68, 165); Gage, 1988: 146; Harris, E.D. and Leng, 1916: 11; Horn, W., 1915: 385, 1926: 285, and 1938: (pl. 76, figs. 4-6); Larochelle, 1986a: 12; Murray and Acciavatti, 1976: 1; Schilder, 1953b: 559; Sumlin, 1975: 59, and 1985: 220, 221, (figs. 3, 4); Wiesner, 1992: 142.

politula petrophila Sumlin, 1985: 220, 223, figs. 6-8 (as subspecies of *C. politula* LeConte). TX: Culberson Co., Guadelupe Mountains Natl. Pk.; NM TX.

TYPE DEPOSITORY: SEMC.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 63; Gage, 1988: 146; Larochelle, 1985: 68; Wiesner, 1992: 142.

BIOLOGY: Huber, 1989: 12.

politula politula LeConte, 1875: 159 (as species). TX; TX; Mex.

TYPE DEPOSITORY: MCZC.

cribrum Casey, 1913: 39 (as subspecies of *C. politula* LeConte). TX.

TYPE DEPOSITORY: USNM.

alleni Cazier, 1939a: 24 (as species; preoccupied Horn, W., 1908c: 409). TX: Howard Co., Signal Mountains. A male allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: F.

alleniana Mandl, 1961b: 25 (replacement name for *alleni* Cazier). TX: Howard Co., Signal Mountains.

TAXONOMY: Bates, 1890: 501; Blackwelder, 1939: 8; Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 63; Boyd et al., 1982: 12; Cazier, 1954: 264, (figs. 67, 164); Chaudoir,

1865: 29; Douglas, 1996: 10; Fleutiaux, 1892: 67; Gage, 1988: 146; Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 40; Harris, E.D. and Leng, 1916: 11; Horn, W., 1915: 385, 1926: 285, 1930: 84, and 1938: 50, (pl. 78, fig. 3); Horn, W. et al., 1897: 175; Huber, 1969a: 19, 1969b: 26, and 1986: 56; Larochelle, 1980b: 40, and 1987b: 51; Leng, 1902a: 117, 181, and 1920: 42; Murray and Acciavatti, 1976: 1; Pearson et al., 1997: 37; Rivalier, 1954: 257; Schaupp, 1884a: 84, 108, (pl. 4, fig. 120); Schilder, 1953b: 559; Sumlin, 1976b: 521, and 1985: 220, 221, (figs. 1, 2); Wiesner, 1992: 142; Willis, 1968: 306.

REDESCRIPTION: Leng, 1902a: 181, (pl. II).

BIOLOGY: Murray and Acciavatti, 1976: 1.

HABITAT: Dry areas, along dirt roads and open hillsides (Cazier, 1954: 264).

politula viridimonticola Gage, 1988: 143, fig. 1 (as subspecies of *C. politula* LeConte). NM: Eddy Co., 129.16 km S. Artesia, above 2,192.8 m elevation.

TYPE DEPOSITORY: FSCA.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 63.

HABITAT: Native habitat (Gage, 1988: 144).

punctulata chihuahuae Bates, 1890: 500 (as variety of *C. punctulata* Olivier). AZ: Chihuahua, Santa Clara and Chihuahua City; NV/ UT CO/ NE KS/ AZ NM TX OK; Mex.

fontinaria Casey, 1916: 33 (as species). NM: Jemez Springs.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 525, (figs. 68-73).

TAXONOMY: Acciavatti et al., 1979: 31; Bousquet, 1991: 10; Boyd et al., 1982: 11; Cazier, 1954: 253, (figs. 49, 148); Drew and Van Cleave, 1961: 103, 113, (fig. 6); Engelhardt, 1918: 230; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 67; Harris, E.D., 1911: 40; Harris, E.D. and Leng, 1916: 10; Horn, W., 1903b: 216, 1915: 383, 1926: 283, and 1930: 84; Horn, W. et al., 1897: 175; Huber, 1986: 56; Hutchings, 1986: 3; Kippenhan, 1994: 68; Knaus, 1922: 195; Knowlton and Wood, 1946: 92; Larochelle, 1986c: 38, 42; Leffler, 1975: 27, 30; Leng, 1920: 41; Mayr, 1969: 179; Murray, 1979: 50; Schaupp, 1884a: 82; Schilder, 1953b: 559; Sumlin, 1976a: 105; Tanner, V.M., 1927: 10, (figs. 200, 205), and 1929: 85; Wiesner, 1992: 140; Willis, 1967: 145, 238, and 1968: 311.

BIOLOGY: Johnson, W.N., 1975a: 22, 23, 1975b: 34, 35, 1977: 18, and 1978a: 28, 29; Knisley, 1984: 93; Larochelle, 1977b: 54, and 1978e: 38; Lawton and Willis, 1974: 52-62; Murray, 1979: 50; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson and Mury Meyer, 1979: 563; Pearson et al., 1988: 407, 413; Rumpp, 1962: 170; Tanner, V.M., 1928: 269.

HABITAT: Margins of freshwater or alkaline streams; lakes, marshes, dry open land, rocky hillsides (Cazier, 1954: 253).

punctulata punctulata Olivier, 1790: 27 (as species). NJ; AB SK MB MT ND SD/ MN WI MI ON PQ/ NV/ WY UT CO/ NE KS IA MO IL IN OH KY/ NY PA NJ DE MD DC/ WV VA/ ME NH VT MA RI CT/ TX OK/ AR LA MS AL TN GA SC NC FL; Mex.

micans Fabricius, 1798: 61 (as species). North America.

jenisonii Gistl, 1837: 55 (as variety of *C. punctulata* Olivier). North America.

boulderensis Casey, 1909: 271 (as species). CO: Boulder Co.

TYPE DEPOSITORY: USNM (type no. 45961).

prolixa Casey, 1916: 33 (as species). CO: Akron.

TYPE DEPOSITORY: USNM (type no. 45962).

IMMATURE STAGES: Bram and Knisley, 1982: 99; Dow, 1916b: 74, (figs. 1, 2); Drew and Van Cleave, 1961: 105, 112; Emmons, 1854: 37; Fabricius, 1801: 238, 241; Hamilton, C.C., 1925: 19, 41, (figs. 69, 106, 136); Knisley and Pearson, 1984: 525; Mury Meyer, 1981: 190, 1983: iii, and 1987: 167; Palmer, 1982: 61; Schultz, 1989: 470; Shelford, 1908: 168; Valenti, 1996b: 47, 49; Williams, F.X., 1916: 123.

TAXONOMY: Acciavatti et al., 1992: 53, 67, (fig. 12); Akerlund, 1907: 88; Basford et al., 1968: 392;

Bates, 1884: 260; Beaulieu, 1900: 140; Beaulne, 1914: 123; Bertholf, 1983: 8, 21, (fig. 22); Blackwelder, 1944: 19; Blatchley, 1910: 30, 35; Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 63; Boyd, 1973: 7, and 1978: 199, 227, (fig. 18); Boyd et al., 1982: 11; Bromley, 1914: 194, 196; Bruner, 1901: 98; Caron, 1951: 180, 182; Casey, 1911: 253, and 1920: 133, 134; Cazier, 1954: 251, 253, (fig. 6); Chaudoir, 1865: 29; Choate, 1975: 73; Ciegler, 1997: 184, 189, (fig. 16); Cresson, 1861: 16; Criddle, 1927: 47; Davis, C.A., 1903: 273; Davis, W.T., 1911a: 217, 1915a: 71, 1915c: 154, 1915d: 156, 1918e: 39, 1919c: 75, and 1919d: 246; Dawson and W. Horn, 1928: 7; Dejean, 1825: 101; Dillon and Dillon, 1961: 51, 55, (pl. V, fig. 8); Dow, 1911: 272; Downie and Arnett, 1996: 80, 83, (fig. 3.16); Dozier, 1918: 296; Drew and Van Cleave, 1961: 103, 112, (fig. 6); Dunn, G.A., 1981a: 6, (fig. 11), and 1986b: 30; Easton, 1909: 36; Eckhoff, 1939: 207, 219; Edwards, J.G., 1949: 73; Emmons, 1854: 37; Fabricius, 1801: 238, 241; Fall and Cockerell, 1907: 155; Fattig, 1935: 154; Fleutiaux, 1892: 67; Fox, W.J., 1902b: 198, and 1903: 337; Gaumer, 1969a: 9, 14, (fig. 16); Gaumer and Murray, 1971: 10; Gaumer et al., 1970: 6; Gemminger and Harold, 1868: 24; Gistl, 1837: 54, 55; Glaser, 1984: 66, 74; Goulet, 1983: 17, 22, (fig. 10); Graves, 1963: 496, 503, (fig. 4), and 1965: 68; Graves and Brzoska, 1991: 4, 5, 22, (fig. 26); Graves and Pearson, 1973: 159, 163, 177, (fig. 13); Green, 1918: 120; Griffith, 1900: 565; Hamilton, J., 1887: 62, and 1889b: 104; Harris, E.D., 1911: 38, and 1918b: 237; Harris, E.D. and Leng, 1916: 10; Harris, T.W., 1852: 1, (fig. E); Hatch, 1924: 547, and 1953: 41; Herbst, 1806: 180, (pl. 172, fig. 2); Hicks, 1965: 37, and 1971: 104; Hilchie, 1985: 322, 331, (fig. 31); Hood, L.E., 1903: 115; Hooper, 1969: 4; Horn, G.H., 1892: 27; Horn, W., 1903a: 190, 194, 1903b: 216, 1915: 383, 1926: 282, 283, 1928: 12, 1930: 84, and 1938: 50, (pl. 77, figs. 9-11); Horn, W. et al., 1897: 174; Huber, 1986: 56, 57; Hutchings, 1985: 3; Johnson, H.L., 1915: 308; Jules, 1937: 2, 4, (fig. 10); King, B.L., 1988: 44; Kippenhan, 1990a: 312, 1994: 23, 67, (fig. 41), and 1996: 30; Kirk, 1969: 7, and 1970: 8; Kirk and Balsbaugh, 1975: 13; Knaus, 1884a: 57, 1884b: 64, 1900a: 114, 1901: 111, 1902b: 131, 1904: 153, 1915a: 35, and 1922: 195; Knisley and Schultz, 1997: 92, 118, (photo. 18); Knisley et al., 1987a: 281, 283, (fig. 8A); Knowlton and Wood, 1946: 92; Landry, L.P., 1979a: 46, and 1979b: 46; Lantz, 1905: 259; Larochelle, 1972b: 60, 1974g: 87, 1975b: 25, 76, 1976a: 77, (fig. 383), 1976b: 73, 77, (fig. 6), 1977c: 65-73, 1980b: 40-42, 1986c: 35-45, 1986d: 61, 1987a: 23-32, 1987b: 52-55, 1989a: 20, and 1989b: 42-47; Larson, P.R., 1981: 52; Lawton, 1970b: 1-4, 6, 7; Lawton and Willis, 1974: 48-65; LeConte, 1848: 182, 1858: 27, and 1860: 53, (fig. 46); Leng, 1902a: 116, 158, 1910a: 73, 1912a: 4, 16, 1915: 560, and 1920: 41; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 93, (fig. 19); Leng and Mutchler, 1927: 7; Liard, 1979a: 16; Löding, 1910: 131; Mandl, 1960: 279; Mather, 1971: 21; Mayr, 1969: 179; Meserve, 1936: 273; Montgomery and Montgomery, 1931: 359; Murray, 1979: 50; Olivier, 1791: 725, 734; Papp, H., 1952: 502; Paxon, 1908: 326; Pearson et al., 1997: 37; Pettit, 1869: 106; Popenoe, 1877: 22; Provancher, 1870: 222; Rivalier, 1954: 256; Rogers, R.V., 1880: 64, and 1881: 22; Say, 1818: 420, 426; Schaupp, 1884a: 82, 98, (pl. 3, figs. 76-78); Schilder, 1953b: 559; Shelford, 1917: 1; Sheppard, 1936: 69; Sherman, F., 1904: 30; Skinner, 1909: 185; Smith, J.B., 1909: 197; Smith, S.G., 1953: 33; Snow, 1877b: 17, 1878b: 63, and 1903: 192; Summers, 1873: 132; Tanner, V.M., 1929: 85; Townsend, 1889: 231, and 1895: 40; Tucker, 1910: 230; Valenti, 1986a: 3; Wallis, 1961: 13, 61, 70, (pl. 4, fig. 96); Weed, 1892: 278; Whelan, 1936: 111; Wickham, 1894: 152, 1899a: 6, and 1911: 5; Wiesner, 1992: 140; Willis, 1967: 238, 1968: 311, and 1970: 5, (fig. 16); Willis and Stamatov, 1971: 48; Wolcott, 1895: 309.

REDESCRIPTION: Leng, 1902a: 158.

BIOLOGY: Acciavatti et al., 1992: 67; Acorn, 1991: 23; Balduf, 1925: 275; Blanchard, 1921: 397; Blatchley, 1910: 35; Brimley, 1906: 85; Cartwright, 1935: 73; Cooper, 1992: 9; Criddle, 1907: 113; Drew and Van Cleave, 1961: 112; Dunn, G.A., 1981b: 9; Erwin, 1981: 124, 138; Fender, 1945: 66; Fox, H., 1910: 81; Freitag, 1972a: 22; Freitag and Tropea, 1969: 17, 18, 21, 22, and 1971: 53; Glaser, 1976: 17, and 1984: 74; Goldsmith, 1916: 447, 454, and 1919: 437, 444; Graves, 1963: 503; Graves and Brzoska, 1991: 22; Graves and Pearson, 1973: 177; Hatch, 1953: 41; Hilchie, 1985: 331; Hood, L.E., 1903: 115; Johnson, W.N., 1972: 19, 20, 1975a: 21, 1975b: 33, 1977: 19, and 1978a: 30; Jones, 1884: 75; King, I.N., 1914: 319; Kippenhan, 1990b: 53; Knisley, 1979: 213; Knisley and Schultz, 1997: 92, 118, (photo. 18); Knisley et al., 1987a: 281; Larochelle, 1972a: 8, 1973a: 32, 1973b: 58, 1974c: 29, 1974e: 69, (fig. 1), 1974f: 83, 84, 1974h: 99, 100, 1975a: 2-4, 1975c: 10, 1977b: 54, and 1985: 68; Lavigne, 1972: 3, 4, and 1977: 25; Lawton, 1972b: 45, 47; Lawton and Willis, 1974: 47-49, 62, 64, 65; Leng, 1902b: 134, 135, 1902d: 239, and 1912: 8; Liebeck, 1890: 159; May et al., 1986: 171; Meserve, 1936: 273; Murray, 1979: 50; Mury Meyer, 1981: 190; Nelson and LaBonte, 1989: 51; Palmer, 1982: 61; Pearson and Juliano, 1991: 225; Pearson et al., 1988: 413; Riley, 1877: 98; Rogers,

L., 1974: 74; Schultz, 1989: 468; Serrano and Yadov, 1984: 337; Shelford, 1911: 584, 1913b: 124, (figs. 3-6), 1915a: 294, (figs. 8, 9), 1915b: 244, (figs. 9, 14, 15), and 1917: 1; Smith, S.G. and Edgar, 1954: 657; Smyth, 1905: 426-430, and 1908: 181; Spomer and Higley, 1993: 394; Vaurie, 1950b: 150; Vogt, 1949: 6; Ward and Bowling, 1980: 29; Whitcomb et al., 1973: 1101; Wickham, 1893: 392, 1899d: 221, and 1901: 20; Will et al., 1995: 62; Willis, 1967: 145, 238, and 1971a: 8; Wilson, D.A., 1975: 45, 49; Wilson, D.A. and Brower, 1983: 18, 31, (fig. 15); Yadav et al., 1985: 5.

HABITAT: Dry sandy loam, hard packed paths and roads on dry, sparsely grassed prairies (Wallis, 1961: 61).

rufiventris cumatilis LeConte, 1851: 173 (as species). LA; TX OK/ AR LA MS AL GA; Mex.

TYPE DEPOSITORY: MCZC.

guexiana Chevrolat, 1852: 419 (as species). LA: Shreveport.

TAXONOMY: Boyd et al., 1982: 12; Cazier, 1954: 272, (figs. 79, 80, 176, 177); Chaudoir, 1865: 29; Cresson, 1861: 11; Downie and Arnett, 1996: 79, 83, (fig. 3.18); Drew and Van Cleave, 1961: 104, 114, (fig. 17); Fleutiaux, 1892: 70; Fox, W.J., 1902b: 198; Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 160, 162, 179, (figs. 16a, b); Harris, E.D., 1911: 36; Harris, E.D. and Leng, 1916: 12; Horn, G.H., 1894: 307; Horn, W., 1896: 171, 1915: 396, 1926: 286, 1930: 84, and 1938: 50, (pl. 78, figs. 13, 14); Larochelle, 1986c: 45; LeConte, 1852: 66, and 1860: 56, (fig. 53); Leng, 1902a: 176, 177, (pl. IV), 1902b: 131, 1915: 563, and 1920: 42; Löding, 1910: 131; Murray, 1979: 53; Nidek, 1978: 41; Rivalier, 1954: 257; Schaupp, 1884a: 84, 106, (pl. 4, fig. 115); Schilder, 1953b: 560; Wiesner, 1992: 142.

BIOLOGY: Graves and Pearson, 1973: 179; Johnson, W.N., 1972: 20; Lawton and Willis, 1974: 62; Leng, 1902b: 134; Murray, 1979: 53; Schultz, 1989: 468; Wickham, 1899d: 226; Wilson, D.A., 1975: 49.

HABITAT: Found around lights in a grassy area about 50 ft. from stream; also along banks of stagnant and freshwater streams and rivers (Cazier, 1954: 272).

rufiventris hentzii Dejean, 1831: 248 (as species; the established junior name *hentzii* is here retained, in place of the rare senior name *heutzii*, for reasons of nomenclatural stability). North America; MA.

haemorrhoidalis Harris, T.W., 1828: 91 (as species; preoccupied Wiedemann, 1823: 63). Type-locality is not given.

niveihamata Frost, C.A., 1920: 230 (as variety of *C. hentzii* Dejean). MA: Stoneham, Middlesex Falls Reservation.

IMMATURE STAGES: Hood, L.E., 1903: 114.

TAXONOMY: Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 12; Casey, 1911: 253; Chaudoir, 1865: 29; Cresson, 1861: 13; Davis, C.A., 1903: 273; Dejean, 1837: 4; Downie and Arnett, 1996: 83; Dunn, G.A., 1986b: 30; Emmons, 1854: 37; Fleutiaux, 1892: 71; Gemminger and Harold, 1868: 17; Gistl, 1837: 56; Harris, E.D., 1911: 36; Harris, E.D. and Leng, 1916: 12; Harris, T.W., 1852: 1, (fig. F), and 1859: 185; Hentz, 1830: 254; Hood, L.E., 1902: 83, and 1903: 113; Horn, G.H., 1892: 27, (fig. 11), and 1894: 307; Horn, W., 1891b: 361, 1893: 336, 1896: 171, 1903b: 216, 1915: 386, 1926: 286, 287, 1930: 84, and 1938: 50, (pl. 78, fig. 15); Huber, 1969a: 20, 21, and 1986: 56; Larochelle, 1986c: 40, 1986d: 62, and 1987a: 25; LeConte, 1848: 182, and 1860: 55, (fig. 50); Leng, 1902a: 176, 177, (pl. IV), and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 95, (fig. 24); Leng and Mutchler, 1927: 7; Rivalier, 1954: 257; Schaupp, 1884a: 84, 106, (pl. 4, fig. 114); Schilder, 1953a: 318, and 1953b: 560; Valenti, 1996a: 32; Ward, 1989: 35; Wiesner, 1992: 142.

BIOLOGY: Harris, E.D., 1913c: 85; Hood, L.E., 1903: 114; Leng, 1902a: 177; Wickham, 1899d: 227; Wilson, D.A., 1971: 33.

HABITAT: Areas of barren ledges (Wilson, D.A., 1971: 33).

rufiventris rufiventris Dejean, 1825: 102 (as species). Saint Domingue; MO IL IN OH KY/ NY PA NJ DE MD DC WV VA/ MA RI CT/ AR LA MS AL TN GA SC NC FL; Mex.

collusor Casey, 1913: 39 (as subspecies of *C. rufiventris* Dejean). Without indication of locality.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Beatty and Knisley, 1982: 1, (figs. 1-11); Valenti, 1986b: 49.

TAXONOMY: Acciavatti et al., 1992: 53, 69, (fig. 13); Bates, 1881: 7, 1884: 259, and 1890: 503; Blackwelder, 1944: 19; Blatchley, 1910: 31, 36, (fig. 25); Bousquet and Larochelle, 1993: 64; Boyd, 1973: 7, and 1978: 198, 224, (fig. 15); Boyd et al., 1982: 12; Cazier, 1954: 268, 269, 272, (fig. 16); Chaudoir, 1865: 29; Ciegler, 1997: 180, 189, (fig. 15); Comboni and Schultz, 1989: 150; Cresson, 1861: 17; Davis, W.T., 1911a: 217, 1915d: 156, and 1918d: 33; Dillon and Dillon, 1961: 51, 58, (pl. V, fig. 9); Eckhoff, 1939: 204, 226; Edwards, J.G., 1949: 73; Fattig, 1935: 154; Fleutiaux, 1892: 70; Fox, W.J., 1900: 101; Gaumer et al., 1970: 6; Gistl, 1837: 56; Glaser, 1984: 66, 68; Graves and Brzoska, 1991: 4, 5, 23, (fig. 27); Graves and Pearson, 1973: 160, 162, 179, (figs. 16a, b); Harris, E.D., 1911: 35; Harris, E.D. and Leng, 1916: 11; Harris, T.W., 1852: 1, (fig. G); Horn, G.H., 1894: 307; Horn, W., 1891b: 361, 1915: 385, 386, 402, 1926: 286, 303, 1930: 84, and 1938: 50, (pl. 78, figs. 11, 12); Horn, W. et al., 1897: 170; Johnson, W.N., 1972: 19; Kirk, 1969: 7, and 1970: 8; Knisley and Schultz, 1997: 91, 124, (photo. 22); Knisley et al., 1987a: 281, 282, (fig. 14); Larochelle, 1977c: 67-72, 1986c: 34-46, and 1987b: 52; Lawton, 1970b: 1, 2, 6; LeConte, 1848: 184, 1860: 56, (fig. 52), and 1866: 362; Leng, 1902a: 176, (pl. II, IV), 1902e: 248, 1915: 563, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 95, (fig. 23); Löding, 1910: 131; Mather, 1971: 22; Montgomery and Montgomery, 1931: 359; Murray, 1979: 53, and 1980: 1; Nicolay, 1923: 118; Pearson et al., 1997: 37; Rivalier, 1954: 257; Schaupp, 1884a: 84, 106, (pl. 4, figs. 112, 113); Schilder, 1953b: 559; Sherman, F., 1904: 31; Smith, J.B., 1909: 198; Valenti, 1986a: 4, and 1996a: 32; Weeks, 1905: 342; Wiesner, 1992: 142; Willis, 1968: 307; Wilson, D.A., 1971: 40, (fig. 6).

REDESCRIPTION: Schaupp, 1884a: 106.

BIOLOGY: Acciavatti et al., 1992: 69; Blatchley, 1910: 36; Boyd, 1978: 224; Cartwright, 1935: 74; Choate, 1975: 73; Comboni and Schultz, 1989: 150; Erwin, 1981: 124, 138; Freitag and Tropea, 1969: 22; Glaser, 1976: 17, and 1984: 68; Graves and Brzoska, 1991: 23; Graves and Pearson, 1973: 179; Harris, E.D., 1913c: 85; Huber, 1980b: 32; Johnson, W.N., 1972: 19; Knisley and Schultz, 1997: 91, 124, (photo. 22); Knisley et al., 1987a: 281; Kritsky and Simon, 1995: 146; Larochelle, 1974c: 30, 1977b: 55, and 1977c: 72; Lavigne, 1977: 25; Leng, 1902d: 239, and 1912: 7; McGovern et al., 1986: 11; Payne, 1971: 129; Pearson et al., 1988: 413; Thomas, 1931: 138; Wickham, 1899d: 226; Wilson, D.A., 1975: 45.

HABITAT: Red clay hills of much of the south; eroded gullies, road cuts, and little used roads and paths; soil red or yellow clay sometimes mixed with sand (Graves and Pearson, 1973: 179).

scabrosa Schaupp, 1884a: 84, 108, pl. 4, fig. 117 (as variety of *C. abdominalis* Fabricius). FL; FL. *extenuata* Casey, 1913: 38 (as species). FL: Crescent City.

TYPE DEPOSITORY: USNM (type no. 45970).

floridana Cartwright, 1939: 364 (as variety of *C. abdominalis*). FL: Miami. Two paratypes (no. 8140) are deposited in CNCI (de Ruette, 1970: 30); and one paratype (no. 3259) in SEMC.

TYPE DEPOSITORY: USNM (type no. 53417).

SEX OF TYPE: M.

TAXONOMY: Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 12; Byers and Karren, 1968: 3; Choate, 1984: 76, (figs. 3, 6); Erwin and House, 1978: 236; Fleutiaux, 1892: 67; Harris, E.D., 1911: 41; Harris, E.D. and Leng, 1916: 11; Horn, W., 1915: 385, 1926: 285, 1930: 84, and 1938: 50, (pl. 78, fig. 2); Lawton, 1970b: 1, 4; Leng, 1902a: 180, 1915: 562, and 1920: 42; Pearson et al., 1997: 37; Rivalier, 1954: 257; Schilder, 1953b: 559; Wiesner, 1992: 142.

BIOLOGY: Roman, 1988: 31; Wickham, 1899d: 228.

HABITAT: Sandy opening along railroad track within tall stand of pine in Osceola National Park, FL (Lawton, 1970b: 4); in sand-pine scrub and along margins of pine flatwoods (Choate, 1984: 77).

schauppii Horn, G.H., 1876a: 240, fig. p. 240 (as species). Eastern TX: Corsicana; KS?/ TX OK; Mex.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1004.2).

SEX OF TYPE: M.

TAXONOMY: Blackwelder, 1944: 18; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 14; Cazier, 1954: 287, (figs. 106, 201); Drew and Van Cleave, 1961: 104, 114, (fig. 18); Fleutiaux, 1892: 62; Gaumer, 1969a: 10, 14, (figs. 17, 18); Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 52; Harris, E.D. and Leng, 1916: 14; Horn, W., 1903b: 219, 1915: 390, 1926: 293, 1930: 85, and 1938: 51, (pl. 81, figs. 1-3); Horn, W. et al., 1897: 182; Leng, 1902a: 117, 178, 179, and 1920: 42; Nidek, 1978: 42; Pearson et al., 1997: 37; Rivalier, 1954: 257; Schaupp, 1884a: 84, 107, (pl. 4, fig. 106, pl. 5, fig. 144); Schilder, 1953b: 559; Ward, 1980: 62; Wiesner, 1992: 145; Willis, 1967: 145, 239, 1968: 312, and 1970: 27, (fig. 27).

REDESCRIPTION: Leng, 1902a: 179, (pl. II, IV).

BIOLOGY: Drew and Van Cleave, 1961: 114; Larochelle, 1975a: 2, and 1977b: 55; Lawton, 1972b: 44; Pearson et al., 1988: 413; Vogt, 1949: 8; Willis, 1967: 239.

HABITAT: Areas of limestone outcroppings, along roads, but not necessarily in vicinity of standing water (Cazier, 1954: 287).

sedecimpunctata sedecimpunctata Klug, 1834: 32 (as species). Mexico; AZ NM TX; Mex., C. Amer.

ventanasa Bates, 1890: 503 (as variety of *C. rufiventris* Dejean). Ventanas in Durango, LaNoria in Sinaloa.

TYPE DEPOSITORY: IPZE (syntypes)

sonorana Casey, 1913: 40 (as subspecies of *C. sedecimpunctata* Klug). AZ, NM, and S. to Durango.

TYPE DEPOSITORY: USNM

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 539, (figs. 116-119); Valenti, 1996b: 49.

TAXONOMY: Acciavatti et al., 1979: 31; Bertholf, 1983: 7, 24, (fig. 26); Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 12; Cazier, 1954: 270, 271, (figs. 15, 77, 174); Cresson, 1861: 18; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 70; Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 36, 37; Harris, E.D. and Leng, 1916: 12; Horn, G.H., 1894: 307; Horn, W., 1891b: 361, 1896: 172, 1903b: 216, 1915: 33, (fig. 94), 386, 1926: 287, 1930: 84, and 1938: 50, (pl. 78, fig. 16); Hutchings, 1986: 3; Knaus, 1904: 153; Larochelle, 1977c: 70; LeConte, 1858: 27, and 1860: 56, (fig. 51); Leng, 1902a: 176, 178, (pl. II), and 1920: 42; Murray, 1979: 52, and 1980: 1; Nidek, 1978: 42; Papp, H., 1952: 507; Pearson et al., 1997: 37; Rivalier, 1954: 257; Rotger, 1975: 77; Schaupp, 1884a: 84, 106, (pl. 4, fig. 111); Schilder, 1953b: 559; Valenti, 1986a: 2; Wiesner, 1992: 143; Willis, 1968: 307.

BIOLOGY: Johnson, W.N., 1975a: 23, 1975b: 35, 1977: 18, and 1978a: 29; Larochelle, 1977b: 55, and 1989a: 23; Leffler, 1975: 26; Murray, 1979: 52; Pearson, 1985: 67, and 1988: 135; Pearson and Juliano, 1991: 225; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 252; Pearson and Mury Meyer, 1979: 562; Pearson et al., 1988: 406, 407, 413; Schultz, 1983: 496; Smyth, 1908: 185-187; Spangler, H.G., 1988: 450; Wickham, 1899d: 226, and 1900a: 82.

HABITAT: Variety of inland habitats, along streams, lakes, springs, or in dry and open grassy areas (Cazier, 1954: 270).

senilis Horn, G.H., 1866: 395, fig. p. 395 (as species). CA; CA.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1001)

SEX OF TYPE: M

exoleta Casey, 1909: 272 (as subspecies of *C. senilis* Horn, G.H.). CA: Oakland.

TYPE DEPOSITORY: USNM

SEX OF TYPE: F

frosti Varas Arangua, 1928: 174 (as subspecies of *C. senilis* Horn, G.H.). CA: Los Angeles Co., Manhattan. One cotype is deposited in CASC.

TYPE DEPOSITORY: CASC (syntype no. 8149)

SEX OF TYPE: M

TAXONOMY: Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 10; Browning, 1900: 583; Casey, 1911: 253; Cazier, 1937c: 159, (pl. 36, fig. 1); Dahl, 1940: 80; Dunn, G.W., 1891: 153; Fleutiaux, 1892: 95; Gemminger and Harold, 1868: 26; Harris, E.D., 1911: 22; Harris, E.D. and Leng, 1916: 7; Horn, W., 1900b: 217, 1902a: 234, 1903a: 195, 1915: 378, (pl. 22, fig. 288), 1926: 274, 1930: 82, and 1938: 49, (pl. 74, fig. 26); Horrisberger, 1971: 28; Huber, 1986: 55; LaRivers, 1946: 138; Larochelle, 1977c: 66; Leng, 1902a: 116, 141, and 1920: 41; Leng and Mutchler, 1933: 9; Nagano, 1982: 36, and 1985: 107; Papp, H., 1952: 511;

Pearson et al., 1997: 37; Rivalier, 1954: 256; Schaupp, 1884a: 81, 92, (pl. 3, fig. 61); Schilder, 1953b: 563; Ward, 1980: 60; Wiesner, 1992: 137; Willis, 1968: 317.

REDESCRIPTION: Leng, 1902a: 141, (pl. II, III).

BIOLOGY: Blaisdell, 1912: 156; Kamoun, 1996: 369; Larochelle, 1972c: 67, and 1974f: 84; Moore, I., 1937: 3; Wickham, 1899d: 218.

HABITAT: Low damp places where soil is sandy or muddy (Wickham, 1899d: 218); dark coloured mud and on a dry salt pan (Nagano, 1982: 36).

tenuisignata LeConte, 1851: 171 (as species). At the New R. in the wilderness of Colorado R.; CA NV/ UT/ KS/ AZ NM TX OK; Mex.

TYPE DEPOSITORY: MCZC.

psilogramma Bates, 1890: 507, pl. 16, fig. 10 (as species). Durango: Villa Lerdo.

TYPE DEPOSITORY: IPZE (syntypes).

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 530, (figs. 80-85).

TAXONOMY: Acciavatti et al., 1979: 31; Bertholf, 1983: 8, 25, (fig. 28); Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 11; Cazier, 1954: 256, (figs. 10, 56, 155); Cresson, 1861: 19; Engelhardt, 1918: 230; Fall, 1895: 179; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 87, 89; Gaumer, 1973: 15; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 27; Harris, E.D., 1911: 45; Harris, E.D. and Leng, 1916: 10; Horn, GH., 1892: 27, (fig. 9); Horn, W., 1892b: 97, 98, 1893: 339, 1903a: 193, 1903b: 218, 1915: 383, 1926: 284, 1930: 84, and 1938: 50, (pl. 77, fig. 19); Horn, W. et al., 1897: 179; Hutchings, 1986: 3; Kippenhan, 1994: 24, 69, (fig. 47); Knaus, 1903: 179, 1906b: 329, and 1922: 194; LaRivers, 1946: 138; Larochelle, 1977c: 73, and 1986c: 38, 42; LaRue, 1994b: 1; LeConte, 1858: 27, and 1860: 44, (fig. 27); Leng, 1902a: 116, 153, and 1920: 41; Pearson et al., 1997: 37; Richman, 1967: 90; Rivalier, 1954: 256; Schaupp, 1884a: 82, 97, (pl. 3, fig. 67; pl. 5, fig. 142); Schilder, 1953b: 558; Sumlin, 1976a: 105; Tanner, V.M., 1929: 86; Vaurie and Vaurie, 1953: 87; Wickham, 1898b: 197; Wiesner, 1992: 140; Willis, 1968: 312.

REDESCRIPTION: Leng, 1902a: 153, (pl. IV).

BIOLOGY: Johnson, W.N., 1975a: 23, 1977: 18, and 1978a: 29; Knisley, 1984: 93; Larochelle, 1977b: 55; Lawton and Willis, 1974: 61, 62; Pearson and Mury Meyer, 1979: 562; Robinson, 1975: 36; Smyth, 1908: 185; Vogt, 1949: 6; Wickham, 1899d: 221, and 1900a: 82.

HABITAT: Sandy margins of estuaries, streams, lakes, irrigation ditches, and alkali flats (Cazier, 1954: 256).

trifasciata ascendens LeConte, 1851: 172 (as species). Georgia; NJ MA/ TX OK/ LA MS TN AL GA SC NC FL; Mex., C. Amer., S. Amer., W. Indies?

TYPE DEPOSITORY: MCZC.

serpens LeConte, 1851: 173 (as species). FL: Key West.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 64; Boyd, 1978: 199, 226, (fig. 17); Boyd et al., 1982: 14; Cazier, 1954: 289, 290, (figs. 111, 206); Chaudoir, 1865: 26; Ciegler, 1997: 180, 191, (fig. 8); Comboni and Schultz, 1989: 151; Cresson, 1861: 10, 18; Davis, W.T., 1916b: 154; Downie and Arnett, 1996: 80, 83, (fig. 3.20); Fabricius, 1781: 286, and 1787: 187; Fattig, 1935: 155; Fleutiaux, 1892: 55; Freitag, 1992: 155; Gaumer, 1969a: 14, (fig. 21), 15; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 28; Glaser, 1984: 66, 74; Graves and Pearson, 1973: 160, 163, 181, (fig. 19); Hamilton, J., 1894: 251, 253; Harris, E.D., 1911: 49, and 1914b: 182; Harris, E.D. and Leng, 1916: 15; Horn, W., 1903b: 219, 221, 1915: 391, 1926: 294, and 1938: 51, (pl. 81, figs. 16, 17); Huber, 1986: 56; Hutchings, 1986: 3, 4; Jonge Poerink, 1953: 132, (figs. 28, 29); Kirk, 1969: 7, and 1970: 8; Knisley and Schultz, 1997: 92, 134, (photo. 29); Larochelle, 1977c: 71, 1980b: 42, 1986c: 36-48, 1987a: 27, 32, 1987b: 56, and 1989a: 26; Lawton, 1970b: 1, 4, 7; LeConte, 1860: 51, (fig. 42); Leng, 1902a: 160, 1902b: 134, 135, 1912: 16, 1915: 560, 1918: 139, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 93, (fig. 25); Leng and Mutchler, 1916: 689, 692; Liebeck, 1890: 159; Linnaeus, 1788: 1922; Löding, 1910: 131; Mandl, 1967: 435; Mather, 1971: 21; Melsheimer, 1806: 46; Nicolay, 1932: 212; Pearson et al., 1997: 37; Rivalier, 1954: 258; Schaupp, 1884a: 98; Schilder, 1953b: 560; Skinner, 1902: 168; Slosson, 1893: 147; Smith, J.B., 1909: 197; Sumlin, 1977: 1, 2; Townsend, 1884c: 219, and 1885: 67; Valenti, 1986a: 5; Wagenaar Hummelinck, 1983: 76;

Wiesner, 1992: 146; Willis, 1968: 311, 312, (fig. 22).

BIOLOGY: Cartwright, 1935: 74; Frost, S.W., 1963: 27, 35; Glaser, 1984: 74; Graves, 1981: 45, and 1982: 18; Graves and Pearson, 1973: 181; Ideker, 1977: 39; Johnson, W.N., 1972: 19, 20; Jonge Poerink, 1953: 132; Kirk, 1969: 7, and 1970: 8; Knisley and Schultz, 1997: 92, 134, (photo. 29); Larochelle, 1977b: 56; Miskimen and Bond, 1970: 78; Pearson, 1988: 135; Valenti, 1986b: 23.

HABITAT: Sandy beaches and mudflats, along seacoast and islands; inland along rivers, small alkaline ponds and lakes (Cazier, 1954: 289; Freitag and Tropea, 1969: 19, 20; Graves and Pearson, 1973: 181).

trifasciata sigmoidea LeConte, 1851: 172 (as species). San Diego; CA/ AZ; Mex.

TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Hamilton, C.C., 1925: 22, (figs. 59, 95, 125).

TAXONOMY: Bates, 1881: 11; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 14; Cazier, 1948: 25, (fig. 20), and 1954: 291; Chaudoir, 1865: 26; Cresson, 1861: 18; Dunn, G.W., 1891: 154; Fall, 1895: 179; Harris, E.D., 1911: 49; Horn, G.H., 1894: 306; Horn, W., 1915: 391, 1926: 294, and 1930: 85; LaRue, 1990: 51, and 1994b: 4; LeConte, 1858: 27, 1860: 52, (fig. 44), and 1861a: 335; Leng, 1902a: 160, and 1920: 42; Mandl, 1967: 435; Nagano, 1985: 107; Pearson et al., 1997: 37; Rivalier, 1954: 258; Schilder, 1953b: 560; Sumlin, 1977: 2; Vaurie and Vaurie, 1953: 84; Wiesner, 1992: 146; Willis, 1968: 311, 312, (fig. 22).

BIOLOGY: Blaisdell, 1892: 49; Ingram, 1934: 51; Larochelle, 1977b: 56; LaRue, 1990: 51; Moore, I., 1937: 3; Pearson, 1988: 135; Wickham, 1899d: 221.

HABITAT: Ocean beaches, dark sand and mud of bays (Nagano, 1982: 38; Wickham, 1899d: 221).

willistoni echo Casey, 1897: 298 (as species). UT: Great Salt Lake; OR ID/ CA NV/ WY UT.

TYPE DEPOSITORY: USNM.

amadeensis Casey, 1909: . 72 (original spelling, emended by Willis, 1967: 294). CA: Amedee.

TYPE DEPOSITO . : USNM.

spaldingi Casey, 1924: 14 (as species). UT: Callao.

TYPE DEPOSITO Y: USNM.

SEX OF TYPE: M.

amedeensis Willis, 1967: 294 (as emendation of *C. echo amadeensis* Casey). CA: Amedee.

TAXONOMY: Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 10; Cazier, 1937c: 157, 158, (pl. 36, fig. 3); Harris, E.D., 1911: 23; Harris, E.D. and Leng, 1916: 7; Hatch, 1953: 42, (pl. II, fig. 3); Horn, W., 1902a: 234, 1903a: 187-192, 1915: 378, 1926: 275, 1930: 82, and 1938: 49, (pl. 75, figs. 1-3); Knaus, 1902: 147, 151, and 1922: 197; LaRivers, 1946: 138; Larochelle, 1977c: 69; Leffler, 1979a: 531; Leng, 1902a: 139, 140, and 1920: 41; Leng and Mutchler, 1927: 7; Maser and Beer, 1984: 48, (fig. 20); Papp, H., 1952: 511; Rivalier, 1954: 256; Schilder, 1953b: 563; Shook, 1984: 159; Sumlin, 1976a: 105; Tanner, V.M., 1927: 10, (figs. 193, 217), and 1929: 84, 85; Valenti, 1986a: 5; Wallis, 1961: 13, 60, 70, (pl. 3, fig. 76); Wickham, 1904a: 44, and 1904b: 647; Wiesner, 1992: 137; Willis, 1967: 294.

REDESCRIPTION: Leng, 1902a: 140, (pl. III).

BIOLOGY: Freitag and Tropea, 1971: 54; Johnson, W.N., 1975a: 22, 23, and 1975b: 34; Lawton and Willis, 1974: 50, 51; Wickham, 1899d: 218; Willis, 1967: 145; Willis and Stamatov, 1971: 51.

HABITAT: Moist alkaline areas (Willis and Stamatov, 1971: 41).

willistoni estancia Rumpp, 1962: 166, fig. 1 (as subspecies of *C. willistoni* LeConte). NM: Torrance Co., 7 mi. E. of Willard; NM.

TYPE DEPOSITORY: Rumpp Collection (CASC).

SEX OF TYPE: M.

TAXONOMY: Acciavatti et al., 1979: 31; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 10; Wiesner, 1992: 137; Willis, 1967: 295.

BIOLOGY: Johnson, W.N., 1978a: 28; Knisley, 1978: 31; Lawton, 1974b: 45; Pearson and Juliano, 1991: 224; Willis, 1967: 145.

HABITAT: Tan, sandy soils usually covered by a white alkaline crust (Willis, 1967: 304); edge of a playa that still contained water from summer rains (Rumpp, 1962: 167).

willistoni funarei Rotger, 1972: 25, fig. p. 27 (as subspecies of *C. willistoni* LeConte). NM: Sandoval Co.; NM.

TYPE DEPOSITORY: CRBR.
SEX OF TYPE: M.
TAXONOMY: Acciavatti and Bowe, 1991: 60; Acciavatti et al., 1979: 31; Bousquet and Larochelle, 1993: 64; Boyd et al., 1982: 10; Wiesner, 1992: 137.
HABITAT: Salty meadow, which receives water from mineral springs (Rotger, 1972: 26).

willistoni hirtifrons Willis, 1967: 301, fig. 168 (as subspecies of *C. willistoni* LeConte). KS: Stafford Co., Big Salt Marsh; KS/ NM TX OK.

IMMATURE STAGES: Valenti, 1996b: 47; Willis, 1967: 172, 176, (figs. 59-67).
TAXONOMY: Acciavatti et al., 1979: 31; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 10; Wiesner, 1992: 137; Willis, 1967: 301, 1970: 7, (fig. 24), and 1975: 16, (figs. 1-4).
BIOLOGY: Johnson, W.N., 1977: 18; Leffler, 1975: 27, 28; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 413; Shivashankar et al., 1988: 63; Willis, 1967: 145; Wilson, D.A., 1975: 45.
HABITAT: Usually red clay or sand (Willis, 1967: 304); open salt flats (Lawton, 1971b: 66).

willistoni praedicta Rumpp, 1956a: 135 (as subspecies of *C. willistoni* LeConte). CA: Inyo Co., 3.5 mi. S. of Shoshone; CA NV. A female allotype is deposited in CASC.

TYPE DEPOSITORY: CASC.
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 10; Wiesner, 1992: 137; Willis, 1967: 295, and 1968: 316.
BIOLOGY: Willis, 1967: 145.

willistoni pseudosenilis Horn, W., 1900a: 117 (as species). CA: Inyo Co., Owens Lake; CA. Syntypes are deposited in IPZE.

TYPE DEPOSITORY: MCZC (cotype).
TAXONOMY: Andrews, F.G. et al., 1979: 30; Blackwelder, 1939: 7; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 10; Cazier, 1937c: 158; Davis, A.C., 1931: 187; Döbler, 1973: 418; Harris, E.D., 1911: 23; Harris, E.D. and Leng, 1916: 7; Horn, W., 1900a: 117, 1900b: 217, 1902a: 234, 1902b: 395, 1903a: 190, 192, 1915: 378, 1926: 275, 1930: 82, and 1938: 49, (pl. 75, fig. 4); LaRivers, 1946: 138; Larochelle, 1987b: 52; Leng, 1902a: 140, 141, and 1920: 41; Nagano, 1982: 40; Rivalier, 1954: 256; Schilder, 1953b: 563; Valenti, 1986a: 5; Wickham, 1904a: 45, and 1904b: 648; Wiesner, 1992: 137; Willis, 1967: 294.
REDESCRIPTION: Leng, 1902a: 141, (pl. III).
BIOLOGY: Andrews, F.G. et al., 1979: 30; Larochelle, 1973a: 32; Rumpp, 1956a: 131; Willis, 1967: 145.
HABITAT: Wet mudflats bordering lakes (Lawton, 1972b: 42).

willistoni sulfoatis Rumpp, 1977: 170, fig. 1a (as subspecies of *C. willistoni* LeConte). AZ: on playa, 5.6 km WSW. of Willcox; AZ.

TYPE DEPOSITORY: CASC (type no. 12530).
SEX OF TYPE: M.
IMMATURE STAGES: Knisley, 1985a: 335, and 1987: 1191; Knisley and Pearson, 1981: 401, and 1984: 465, 514, (figs. 120, 121); Leffler, 1979a: 87; Valenti, 1996b: 48.
TAXONOMY: Bertholf, 1983: 8, 28, (fig. 33); Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 10; Hutchings, 1986: 3; Wiesner, 1992: 137.
BIOLOGY: Johnson, W.N., 1978a: 29; Pearson, 1985: 70; Pearson and Mury Meyer, 1979: 561.
HABITAT: Wind carved sinks and playa near railroad tracks and blowouts near the shores of playa in Sulphur Springs Valley, AZ (Rumpp, 1977: 171).

willistoni willistoni LeConte, 1879: 507 (as species). Wyoming Territory, Lake Como; WY.

TYPE DEPOSITORY: MCZC.
IMMATURE STAGES: Pearson, 1988: 134; Valenti, 1996b: 49.
TAXONOMY: Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 10; Cazier, 1937c: 157, (pl. 36, fig. 2); Choate, 1975: 73; Dahl, 1940: 80; Fleutiaux, 1892: 108; Harris,

E.D., 1911: 22; Harris, E.D. and Leng, 1916: 7; Horn, W., 1902a: 234, 1903a: 183, 192, 1915: 378, 1926: 275, 1930: 82, and 1938: 49, (pl. 74, figs. 27, 28); Leng, 1902a: 116, 140, and 1920: 41; Pearson et al., 1997: 37; Rivalier, 1954: 255, 256, (fig. 3b); Rumpp, 1977: 172; Schaupp, 1884a: 81, 91, (pl. 3, fig. 60); Schilder, 1953b: 563; Wallis, 1961: 13, 60, 70; Wickham, 1904b: 647; Willis, 1967: 294, and 1968: 317.

REDESCRIPTION: Leng, 1902a: 140, (pl. III).

BIOLOGY: Larochelle, 1978e: 37; Lawton and Willis, 1974: 48, 49; Niemelä and Ranta, 1993: 87; Pearson, 1988: 134; Vaurie, 1950b: 153; Wickham, 1899d: 217; Wiesner, 1992: 137; Willis, 1967: 294; Willis and Stamatov, 1971: 50.

HABITAT: Wet playas defined as seasonal salt flats or perennial lakebeds (Rumpp, 1977: 172).

Subgenus HABROSCELIMORPHA Dokhtouroff

Habroscelimorpha Dokhtouroff, 1883b: 69 (as subgenus). Type-species: *Cicindela dorsalis* Say (design. by Horn, W., 1915: 236).

TAXONOMY: Arnett, 1963: 53; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 14; Horn, W., 1926: 135; Rivalier, 1954: 250, 258, 1963: 48, and 1971: 142; Schilder, 1953b: 560; Wiesner, 1992: 214.

californica mojavi Cazier, 1937b: 116 (as subspecies of *C. californica* Ménétriés). CA: Saltdale; CA; Mex. A female allotype is deposited in AMNH.

SEX OF TYPE: M.

TAXONOMY: Acciavatti, 1980: 233; Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 14; Cazier, 1948: 23, and 1954: 289, (figs. 110, 204); Douglas, 1996: 10; Larochelle, 1986a: 13; LaRue, 1990: 51, and 1994b: 3; Pearson et al., 1997: 38; Richman, 1967: 89, and 1969: 19, 21, (figs. 6, 7); Rumpp, 1958: 149, (pl. 32, figs. n-q); Schilder, 1953b: 559; Vaurie and Vaurie, 1953: 80; Wiesner, 1992: 214; Willis, 1968: 312, (fig. 21).

BIOLOGY: Larochelle, 1977b: 51.

HABITAT: Coastal salt marsh and adjacent beach; though some adults were collected during the day, most were taken at light at night (Cazier, 1954: 289); sandy beaches of Salton Sea (Lawton, 1972b: 35, 43).

californica pseudoerronea Rumpp, 1958: 150, pl. 32, figs. e-i (as subspecies of *C. californica* Ménétriés). CA: Inyo Co., Death Valley, 7 mi. N. of Furnace Cr.; CA.

TYPE DEPOSITORY: Rumpp Collection (CASC).

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 14; Pearson et al., 1997: 37; Valenti, 1986a: 1; Wiesner, 1992: 214; Willis, 1968: 312, (fig. 21).

BIOLOGY: Larochelle, 1977b: 51.

HABITAT: Damp salt flats, rivers and stream basin of Death Valley (Rumpp, 1958: 151).

circumpicta circumpicta LaFerté-Sénectère, 1841: 39 (as species). TX; TX; Mex.

collaris LaFerté-Sénectère, 1841: 40, 95 (as unjustified name recognized by LaFerté-Sénectère). TX.

inspiciens Casey, 1913: 33 (as subspecies of *C. circumpicta* LaFerté-Sénectère). TX: Point Isabel.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

IMMATURE STAGES: Pearson, 1988: 129; Willis, 1967: 185.

TAXONOMY: Acciavatti, 1980: 233; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 14; Cazier, 1954: 287, (figs. 107, 202); Cresson, 1861: 11; Drew and Van Cleave, 1961: 105, 108, (fig. 11); Fall, 1895: 178; Fleutiaux, 1892: 61; Gaumer, 1969a: 7, 12, (figs. 5, 6); Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 160, 163, 194, (fig. 21); Harris, E.D., 1911: 53; Harris, E.D. and Leng, 1916: 14; Horn, W., 1903b: 219, 1915: 390, 1926: 293, 1930: 85, and

1938: 51, (pl. 81, figs. 4, 5); Johnson, W.N., 1993b: 41, and 1993c: 53, 57; Larochelle, 1977c: 73, and 1986c: 42; LeConte, 1860: 58, (fig. 57); Leng, 1902a: 116, 171, 172, and 1920: 42; Murray, 1979: 54, 55; Papp, H., 1952: 510; Pearson et al., 1997: 38; Rivalier, 1954: 258, (fig. 4a); Schaupp, 1884a: 84, 104, (pl. 4, figs. 101, 102); Schilder, 1953b: 559; Valenti, 1986a: 1; Wickham, 1898a: 23; Wiesner, 1992: 214; Willis, 1967: 240, and 1968: 312, (fig. 20).

REDESCRIPTION: Leng, 1902a: 172, (pl. II, IV); Schaupp, 1884a: 104.

BIOLOGY: Acciavatti, 1973: 25; Drew and Van Cleave, 1961: 108; Graves and Pearson, 1973: 194; Johnson, W.N., 1972: 20, 1975a: 23, 24, and 1977: 19; Kritsky and Simon, 1995: 146; Larochelle, 1974c: 24, 1977b: 51, and 1978e: 38; Lawton and Willis, 1974: 64; Leng, 1902a: 172; Murray, 1979: 55; Niemelä and Ranta, 1993: 87; Pearson, 1988: 129, 137; Riley, 1877: 98; Vaurie, 1950b: 144; Wickham, 1899d: 225; Willis, 1967: 145, 240.

HABITAT: Alkaline situations along seacoast or inland near salt lakes and marshes (Cazier, 1954: 287; Lawton, 1972b: 35, 45).

circumpicta johnsonii Fitch, 1857: 487 (as species). Prairie buffalo trails W. of the Arkansas; ND/ CO/ NE KS MO/ NM TX OK; Mex.

ambiens Casey, 1913: 33 (as subspecies of *C. circumpicta* LaFerté-Sénectère). KS.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

salinae Vaurie, 1951: 3 (as subspecies of *C. circumpicta* LaFerté-Sénectère). NE: Lancaster Co., Lincoln. A female allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

IMMATURE STAGES: Spangler, P.J., 1955: 81; Valenti, 1996b: 47; Willis, 1967: 163, (figs. 35-40).

TAXONOMY: Acciavatti et al., 1979: 31; Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 14; Bruner, 1901: 98; Drew and Van Cleave, 1961: 105, 108, (fig. 11); Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 62; Gaumer and Murray, 1971: 10; Harris, E.D. and Leng, 1916: 14; Horn, W., 1915: 390, 1926: 293, and 1930: 85; Johnson, W.N., 1993c: 53, 57; Kippenhan, 1990a: 312, 1994: 24, 72, (fig. 49), and 1995b: 53; Knaus, 1900a: 114, 1904: 153, 1913: 89, and 1924b: 171; Lantz, 1905: 260; Larochelle, 1977c: 70, and 1987a: 29; Larson, P.R., 1981: 52; LeConte, 1858: 27; Leng, 1902a: 172, and 1920: 42; Meserve, 1936: 273; Murray, 1979: 54; Popenoe, 1877: 22; Rumpp, 1958: 146, (pl. 31, figs. k-l), and 1962: 168; Schilder, 1953b: 559; Snow, 1878b: 63, and 1903: 192; Uscian et al., 1992: 833, and 1995: 135; Valenti, 1986a: 1; Wiesner, 1992: 214; Willis, 1967: 241, 1968: 312, (fig. 20), and 1970: 2, (fig. 3).

BIOLOGY: Drew and Van Cleave, 1961: 108; Johnson, W.N., 1975a: 21, 1975b: 35, and 1978a: 28; Larochelle, 1974c: 24, and 1977b: 51; Lawton and Willis, 1974: 47, 59, 61; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 414; Robinson, 1975: 36; Schultz, 1986: 143; Smyth, 1905: 429; Spomer and Higley, 1993: 394; Vaurie, 1950b: 144; Willis, 1967: 145, and 1974: 4; Willis and Stamatov, 1971: 42; Wilson, D.A., 1975: 45.

HABITAT: Edges of alkaline ditches and grassy areas (Lawton and Willis, 1974: 47; Wilson, D.A., 1975: 45); alkaline habitats along streams, in areas of internal drainage or in coastal tidal flats (Lawton, 1972b: 35, 47; Murray, 1979: 55).

circumpicta pembina Johnson, W.N., 1993c: 53 (as subspecies of *C. circumpicta* LaFerté-Sénectère). ND: Pembina Co., near Pembina; ND.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

HABITAT: Very small saline flat, open areas (Johnson, W.N., 1993c: 56).

dorsalis dorsalis Say, 1817: 20 (as species). NJ: on the sea beach; NY NJ MD VA/ MA RI CT.

signata Dejean, 1825: 124 (as species). North America.

semipicta Casey, 1897: 299 (as subspecies of *C. dorsalis* Say; preoccupied Fairmaire, 1871: 30). Unrecorded locality.

TYPE DEPOSITORY: USNM.

munifica Casey, 1913: 31 (as species). RI.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

lineoscripta Casey, 1924: 16 (new name for *C. semipicta* Casey). Type-locality not given.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Bram and Knisley, 1982: 99; Fox, W.J., 1898: 207; Knisley et al., 1987b: 293.

TAXONOMY: Arnett, 1993: 287; Blackwelder, 1944: 17; Bousquet and Larochelle, 1993: 65; Boyd, 1975: 55, and 1978: 198, 228, (fig. 19); Boyd and Rust, 1982: 221, 222; Boyd et al., 1982: 14; Cazier, 1954: 293, 294; Chaudoir, 1865: 33; Clarkson, 1885: 106; Cresson, 1861: 12; Davis, C.A., 1903: 273; Davis, W.T., 1917b: 88; Dillon and Dillon, 1961: 50, 58, (pl. V, figs. 11, 12); Downie and Arnett, 1996: 78, 83, (fig. 3.21a); Dunn, G.A., 1986b: 30; Edwards, J.G., 1949: 73; Engelhardt, 1910: 130; Fall, 1895: 177; Fattig, 1935: 155; Fleutiaux, 1892: 83; Gemminger and Harold, 1868: 14; Glaser, 1976: 17, 20, (fig. 1), 1977: 12, and 1984: 66; Gould, 1834: 47; Graves and Pearson, 1973: 160, 162, 182, (figs. 20a, b); Hamilton, J., 1885b: 201; Harris, E.D., 1911: 47, and 1916a: 101; Harris, E.D. and Leng, 1916: 16; Harris, T.W., 1852: 1, (fig. U); Hoffman, 1991: 176; Hood, L.E., 1903: 115; Horn, G.H., 1892: 26; Horn, W., 1903a: 193, 1915: 37, (figs. 154, 155), 392, 1926: 295, 1930: 86, and 1938: 51, (pl. 81, fig. 27); Huber, 1969a: 22, and 1986: 56; Knisley and Schultz, 1997: 91, 102, (photo. 6); Larochelle, 1977c: 67-71, 1986c: 36-42, 1986d: 59, 1987a: 23, 26, 1987b: 53, 57, and 1989a: 18; LeConte, 1848: 181, and 1860: 46, 47, (fig. 32); Leng, 1902a: 116, 160, 161, 1912a: 4, 6, 15, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 93, (fig. 4); Leng and Mutchler, 1927: 7; Papp, H., 1952: 508; Pearson et al., 1997: 38; Rivalier, 1954: 258; Rumpp, 1958: 146, (pl. 31, figs. i-j); Say, 1818: 415; Schaupp, 1880: 79, 1881: 14, and 1884a: 82, 99, (pl. 4, figs. 91, 92); Schilder, 1953b: 560; Skinner, 1909: 185; Smith, J.B., 1909: 197; Stamatov, 1972: 78; Valenti, 1986a: 1; Vogler and DeSalle, 1993: 1192, 1994a: 354, and 1994b: 393; Vogler and Pearson, 1996: 324; Vogler et al., 1993a: 142, and 1993b: 375; Weiss and West, 1925: 231; Wiesner, 1992: 215; Willis, 1968: 306; Wilson, D.A., 1970: 18; Yarbrough and Knisley, 1994: 189.

REDESCRIPTION: Leng, 1902a: 161, (pl. II, IV).

BIOLOGY: Boyd, 1978: 228; Choate, 1975: 74; Clancy, 1996: 8; Davis, W.T., 1919b: 27; Dimmock, 1883: 6; Dunn, G.A., 1978: 2; Fielding and Knisley, 1995: 61; Fox, H., 1910: 78; Glaser, 1976: 17, and 1984: 66; Graves, 1989: 40; Graves and Pearson, 1973: 182; Huber, 1989: 12; Knisley and Schultz, 1997: 91, 102, (photo. 6); Knisley et al., 1987b: 293; Larochelle, 1977b: 51, and 1980b: 41; Lavigne, 1972: 3; Liebeck, 1890: 159; Pearson and Cassola, 1992: 387; Shelford, 1913b: 125; Snyder, H.A., 1908: 147; Vogler and DeSalle, 1993: 1192, 1994a: 354, and 1994b: 393; Vogler and Pearson, 1996: 324; Vogler et al., 1993a: 142, and 1997: 6; Wickham, 1899d: 221.

HABITAT: Sandy beaches of seacoast (Graves and Pearson, 1973: 182).

dorsalis media LeConte, 1860: 47, fig. 33 (as species). GA and SC seacoasts; NJ DE MD VA/ GA SC NC FL.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 65; Boyd, 1975: 55, and 1978: 228, (fig. 20); Boyd and Rust, 1982: 221, 222; Boyd et al., 1982: 14; Chaudoir, 1865: 33; Ciegler, 1997: 180, 186, (fig. 23); Cresson, 1861: 15; Downie and Arnett, 1996: 78, 83, (fig. 3.21b); Dozier, 1918: 296; Fattig, 1935: 155; Fleutiaux, 1892: 83; Gemminger and Harold, 1868: 14; Glaser, 1976: 18, 20, (fig. 1), 1977: 12, and 1984: 67; Hamilton, J., 1894: 251, 253; Harris, E.D., 1911: 48; Harris, E.D. and Leng, 1916: 16; Horn, W., 1903a: 193, 1903b: 218, 1915: 392, 1926: 295, and 1930: 86; Kirk, 1969: 7, and 1970: 8; Larochelle, 1977c: 66, 1987a: 27, 1987b: 56, and 1989a: 18; Lawton, 1970b: 1-3, 5, 6; LeConte, 1866: 362; Leffler, 1973: 35; Leng, 1902a: 160, 161, 1915: 561, 1918: 140, and 1920: 42; Nicolay, 1932: 212; Schaupp, 1884a: 82, 99, (pl. 4, fig. 93); Schilder, 1953b: 560; Sherman, F., 1904: 31; Valenti, 1986a: 1; Vogler and DeSalle, 1993: 1193, and 1994b: 394; Vogler et al., 1993a: 142; Wagenaar Hummelinck, 1983: 88; Wiesner, 1992: 215; Yarbrough and Knisley, 1994: 189.

BIOLOGY: Boyd, 1978: 228; Cartwright, 1935: 74; Fielding and Knisley, 1995: 61; Glaser, 1984: 67; Knisley and Hill, 1992: 133; Knisley et al., 1987b: 294; Larochelle, 1977b: 51; Vogler et al., 1993a: 142; Wickham, 1899d: 222; Yarbrough and Knisley, 1994: 189.

HABITAT: Sandy ocean beach (Freitag and Tropea, 1969: 18, 19).

dorsalis saulcyi Guérin-Méneville, 1840: 37 (as species). North America: Pensacola; MS AL FL.
castissima Bates, 1884: 260 (as species). Gulf of Mexico: Arcas Islets. Found on shore

of Arcas Islets (Cazier, 1954: 294).

TYPE DEPOSITORY: BMNH.

apricoidea Casey, 1913: 32 (as species). LA and MS seabeaches.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Hamilton, C.C., 1925: 17, 20, (figs. 78, 115, 147); Valenti, 1996b: 46.

TAXONOMY: Blaisdell, 1925: 81; Blatchley, 1923: 14; Bousquet and Larochelle, 1993: 65; Boyd and Rust, 1982: 221, 223; Boyd et al., 1982: 14; Cazier, 1954: 294, (figs. 118, 213); Chaudoir, 1865: 33; Cresson, 1861: 17; Edwards, J.G., 1949: 73; Fall, 1895: 177; Fleutiaux, 1892: 84; Gemminger and Harold, 1868: 26; Graves and Pearson, 1973: 160, 162, 182, (figs. 20a, b); Harris, E.D., 1911: 48; Harris, E.D. and Leng, 1916: 16; Horn, G.H., 1892: 27, (fig. 18); Horn, W., 1903a: 193, 194, 1903b: 218, 1915: 393, 1926: 296, 1930: 86, and 1938: 51, (pl. 81, fig. 28); Knisley et al., 1987b: 294; LaFerté-Sénectère, 1841: 96; Larochelle, 1987a: 21, and 1989a: 18; Lawton, 1970b: 1, 5, 7; LeConte, 1848: 184, 1858: 27, 1860: 47, (fig. 34), and 1866: 362; Leng, 1902a: 160, 161, (pl. IV), and 1920: 42; Mather, 1971: 21; Rivalier, 1954: 258; Robinson, 1948: 27; Schaupp, 1884a: 82, 99, (pl. 4, fig. 94); Schilder, 1953b: 560; Vogler and DeSalle, 1993: 1193, and 1994b: 394; Wiesner, 1992: 215; Yarbrough and Knisley, 1994: 189.

BIOLOGY: Freitag and Tropea, 1969: 20; Graves and Pearson, 1973: 182; Johnson, W.N., 1972: 20; Knisley et al., 1987b: 294; Vogt, 1949: 8; Wickham, 1899d: 222.

HABITAT: Open tracks of fine white sandy ocean beaches (Wickham, 1899d: 222).

dorsalis venusta LaFerté-Sénectère, 1841: 37 (as species). TX; TX/ LA; Mex.

TAXONOMY: Bousquet and Larochelle, 1993: 65; Boyd and Rust, 1982: 221, 223; Boyd et al., 1982: 14; Cazier, 1954: 294, (figs. 117, 212); Chaudoir, 1865: 33; Cresson, 1861: 17; Fattig, 1935: 155; Fleutaiux, 1892: 84; Gaumer, 1969a: 7, 12, (figs. 7, 8); Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 160, 162, 182, (figs. 20a, b), 183; Harris, E.D., 1911: 48; Harris, E.D. and Leng, 1916: 16; Horn, W., 1903a: 193, 1903b: 218, 1915: 393, 1926: 296, 1930: 86, and 1938: 51, (pl. 82, figs. 1, 2); Horn, W. et al., 1897: 181; Huber, 1969a: 22, and 1986: 56; LaFerté-Sénectère, 1841: 96; Larochelle, 1989a: 18; LeConte, 1858: 27, and 1860: 47, (fig. 34); Leng, 1920: 42; Schaupp, 1884a: 99; Schilder, 1953b: 560; Valenti, 1986a: 1; Vogler and DeSalle, 1993: 1193, and 1994b: 394; Wiesner, 1992: 215; Yarbrough and Knisley, 1994: 189.

BIOLOGY: Graves and Pearson, 1973: 182; Ideker, 1977: 39; Johnson, W.N., 1975a: 23; Knisley et al., 1987b: 294; Lawton and Willis, 1974: 63.

HABITAT: Lower sandy beach areas of the Gulf of Mexico (Lawton, 1972b: 45).

fulgoris albilata Acciavatti, 1980: 237, 238, fig. 3D (as subspecies of *C. fulgoris* Casey). TX: Hudspeth Co., Salt Flat, 2 mi. E. of playa lakes; NM TX.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 65; Boyd et al., 1982: 14; Valenti, 1986a: 2; Wiesner, 1992: 215.

HABITAT: Open salt flats (Acciavatti, 1980: 240).

fulgoris erronea Vaurie, 1951: 12 (new name for *C. californica viridicyanea* Vaurie, new combination, as subspecies of *C. fulgoris* Casey). AZ: Cochise, Co., Willcox; AZ.

viridicyanea Vaurie, 1950a: 1 (as subspecies of *C. californica* Ménétriés; preoccupied, Audouin and Brullé, 1839: 119). A female allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M

IMMATURE STAGES: Knisley, 1985a: 335; Knisley and Juliano, 1988: 1983.

TAXONOMY: Acciavatti, 1980: 237, 238; Bertholf, 1983: 8, 20; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 14; Huber, 1969a: 22, and 1986: 56; Hutchings, 1986: 3, 4; Rumpp, 1956a: 131, and 1957: 144, (pl. 31, figs. d-h); Wiesner, 1992: 215.

BIOLOGY: Acciavatti, 1980: 239; Johnson, W.N., 1975b: 35, 1977: 19, and 1978a: 29; Larochelle, 1977b: 54; Lawton and Willis, 1974: 56, 57; Pearson and Juliano, 1991: 224; Rumpp, 1956a: 131, and 1977: 176.

HABITAT: Wet saline flats on edge of water and around ponds formed in adjoining depressions (Rumpp, 1977: 176).

fulgoris fulgoris Casey, 1913: 34 (as subspecies of *C. praetextata* LeConte). TX: El Paso; AZ NM TX; Mex. Seven syntypes are deposited in USNM.

TYPE DEPOSITORY: USNM (lectotype).

SEX OF TYPE: M.

stringens Casey, 1913: 34 (as subspecies of *C. praetextata* LeConte). TX: El Paso.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: F.

IMMATURE STAGES: Knisley, 1987: 1191; Knisley and Pearson, 1984: 465, 522, (figs. 62-67); Valenti, 1996b: 49.

TAXONOMY: Acciavatti, 1980: 233, 237, (figs. 2C, D, 3C); Acciavatti et al., 1979: 31; Bertholf, 1983: 8, 19, (fig. 19); Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 14; Gaumer and Murray, 1971: 10; Harris, E.D. and Leng, 1916: 14; Horn, W., 1915: 391, 1926: 294, and 1930: 85; Hutchings, 1986: 3, 4; Leng, 1920: 42; Murray, 1979: 55; Pearson et al., 1997: 38; Rumpp, 1961: 172; Wiesner, 1992: 215.

BIOLOGY: Johnson, W.N., 1975a: 23, 1977: 18, and 1978a: 29; Larochelle, 1977b: 54; Lawton and Willis, 1974: 59, 61; Leffler, 1975: 27; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson et al., 1988: 414.

HABITAT: Margins of saline lakes, ponds and marshes (Acciavatti, 1980: 238).

gabbii Horn, G.H., 1866: 395, fig. p. 396 (as species). CA: San Pedro (Wilmington); CA; Mex.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1003).

SEX OF TYPE: M.

TAXONOMY: Bates, 1881: 11; Blackwelder, 1944: 18; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 14; Cazier, 1948: 21, (fig. 21), and 1954: 291, (figs. 112, 207); Dunn, G.W., 1891: 154; Fall, 1895: 179; Fleutiaux, 1892: 87; Gemminger and Harold, 1868: 16; Harris, E.D., 1911: 48; Harris, E.D. and Leng, 1916: 15; Horn, G.H., 1892: 27, (fig. 17); Horn W., 1903b: 219, 1915: 33, (fig. 104), 391, 1926: 294, 1930: 85, and 1938: 51, (pl. 81, figs. 18, 19); Horn, W. et al., 1897: 181; Ingram, 1934: 52; Leng, 1902a: 116, 168, and 1920: 42; Nagano, 1982: 39; Pearson et al., 1997: 38; Rivalier, 1954: 259; Rumpp, 1958: 146, (pl. 31, figs. m, n); Schaupp, 1884a: 83, 102, (pl. 3, fig. 89); Schilder, 1953b: 560; Vaurie and Vaurie, 1953: 80; Ward, 1980: 62; Wiesner, 1992: 214; Willis, 1968: 312.

REDESCRIPTION: Leng, 1902a: 168, (pl. IV).

BIOLOGY: Blaisdell, 1892: 49; Ingram, 1934: 51; Leng, 1902a: 168; Moore, I., 1937: 3; Wickham, 1899d: 223.

HABITAT: Alkali flats or salt marshes along the coast in open areas, among salt grasses (Cazier, 1954: 291).

pamphila LeConte, 1873: 321 (as species). TX; TX/ LA MS; Mex.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Cazier, 1954: 295, (figs. 123, 218); Dokhtouroff, 1887: 151; Fleutiaux, 1892: 62; Gaumer, 1969a: 9, 12, (fig. 14); Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 160, 163, 184, (fig. 22); Harris, E.D., 1911: 53; Harris, E.D. and Leng, 1916: 16; Horn, G.H., 1892: 26, (fig. 4); Horn, W., 1915: 393, 1926: 296, 1930: 86, and 1938: 51, (pl. 82, fig. 6); Johnson, W.N., 1993b: 41; Larochelle, 1977c: 73; Leng, 1902a: 116, 171, and 1920: 42; Mather, 1971: 22; Pearson et al., 1997: 38; Rivalier, 1954: 259; Schaupp, 1884a: 84, 104, (pl. 4, fig. 105); Schilder, 1953b: 560; Valenti, 1986a: 3; Wickham, 1898a: 23; Wiesner, 1992: 215; Willis, 1968: 309, (fig. 14).

REDESCRIPTION: Leng, 1902a: 171, (pl. II, IV); Schaupp, 1884a: 104.

BIOLOGY: Graves and Pearson, 1973: 184; Johnson, W.N., 1972: 20, and 1975a: 23, 24; Kritsky and Simon, 1995: 146; Lawton, 1972b: 45; Lawton and Willis, 1974: 63; Pearson et al., 1988: 414; Shelford, 1913b: 125; Vogt, 1949: 8; Wickham, 1899d: 225.

HABITAT: Shores or inlets of the Gulf of Mexico (Graves and Pearson, 1973: 184).

praetextata pallidofemora Acciavatti, 1980: 233, 236, fig. 3B (as subspecies of *C. praetextata* LeConte). UT: Wash. Co., St. George, Virgin River; NV/ UT.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 14; Engelhardt, 1918: 230; Knowlton and Wood, 1946: 93; Tanner, V.M., 1929: 87; Wiesner, 1992: 215.

HABITAT: Mudflats of the Virgin River (Acciavatti, 1980: 237).

praetextata praetextata LeConte, 1854b: 220 (as species). San Diego to El Paso; CA/ AZ.

TYPE DEPOSITORY: MCZC (lectotype).

TAXONOMY: Acciavatti, 1980: 233, (figs. 2A, B, 3A); Bertholf, 1983: 8, 18; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 14; Cazier, 1948: 24, and 1954: 288; Cresson, 1861: 16; Davis, A.C., 1931: 187; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 62; Gemminger and Harold, 1868: 24; Griffith, 1900: 565; Harris, E.D., 1911: 53; Harris, E.D. and Leng, 1916: 14; Horn, G.H., 1894: 307; Horn, W., 1902b: 385, 386, 1903a: 187, 193, 1903b: 219, 1915: 39, 1926: 293, 1930: 85, and 1938: 51, (pl. 81, figs. 9-12); Horn, W. et al., 1897: 183; Larochelle, 1977c: 68, 1986a: 13, 1986c: 38, and 1987b: 52; LeConte, 1858: 27, and 1860: 58, (fig. 58); Leng, 1902a: 171, 172, and 1920: 42; Pearson et al., 1997: 38; Richman, 1967: 89; Rivalier, 1954: 258; Rumpp, 1958: 144, 146, (pl. 31, figs. a-d); Schaupp, 1884a: (pl. 4, fig. 104); Schilder, 1953b: 559; Sumlin, 1976a: 105; Tanner, V.M., 1927: 10, (figs. 201, 219); Wiesner, 1992: 215; Willis, 1968: 312.

BIOLOGY: Acciavatti, 1980: 236; Johnson, W.N., 1978a: 29; Larochelle, 1977b: 54; LaRue, 1990: 51; Lawton, 1972b: 43; Moore, I., 1937: 3; Murray, 1979: 55; Pearson and Mury Meyer, 1979: 563; Shelly and Pearson, 1978: 791; Wickham, 1893: 392, and 1900a: 82.

HABITAT: Riparian, sandy habitats in lower Colorado River system, Gila-Salt River system and the basin of Salton Sea (Acciavatti, 1980: 232).

severa severa LaFerté-Sénectère, 1841: 41 (as species). TX; TX/ LA MS AL FL; Mex.

alabamae Casey, 1920: 134 (as subspecies of *C. severa* LaFérté-Sénectère). AL: Coden.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

TAXONOMY: Bates, 1881: 12; Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Cazier, 1954: 261, (figs. 64, 161); Cresson, 1861: 18; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 62; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 26; Graves and Pearson, 1973: 160, 163, 184, (fig. 23); Harris, E.D., 1911: 40; Harris, E.D. and Leng, 1916: 10; Horn, W., 1903b: 219, 1915: 384, 1926: 284, 1930: 84, and 1938: 50, (pl. 77, fig. 24); Johnson, W.N., 1993b: 41; Larochelle, 1977c: 73, and 1986c: 45; Lawton, 1970b: 1, 5, 7; LeConte, 1848: 184, 1858: 27, and 1860: 58, (fig. 56); Leng, 1902a: 116, 173, 1912: 16, 1915: 562, and 1920: 41; Leng and Mutchler, 1927: 7; Löding, 1910: 131; Mather, 1971: 22; Pearson et al., 1997: 38; Rivalier, 1954: 259, (fig. 4c); Schaupp, 1884a: 84, 105, (pl. 4, figs. 98, 99); Schilder, 1953b: 558; Valenti, 1986a: 4; Wickham, 1898a: 23; Wiesner, 1992: 216; Willis, 1968: 311.

REDESCRIPTION: Leng, 1902a: 173; Schaupp, 1884a: 105.

BIOLOGY: Acciavatti, 1973: 25; Gaumer, 1969a: 10, 14, (fig. 17); Graves and Pearson, 1973: 184; Johnson, W.N., 1975a: 24; Kritsky and Simon, 1995: 146; Larochelle, 1977b: 55; Lawton, 1970b: 5, and 1972b: 45; Lawton and Willis, 1974: 64; Mitchell, 1902: 110; Pearson et al., 1988: 414; Vogt, 1949: 6; Wickham, 1899d: 225.

HABITAT: Open areas in saline marshes and mudflats along the gulf coast (Graves and Pearson, 1973: 184).

striga LeConte, 1875: 160 (as species). FL: Lake Harvey; SC FL.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Ciegler, 1997: 184, 190; Franck, 1916: 91; Harris, E.D. and Leng, 1916: 10; Horn, W., 1915: 384, 1926: 284, 1930: 84, and 1938: 50, (pl. 77, fig. 25); Huber, 1969a: 22; Kirk, 1970: 7; Knisley and Schultz, 1997: 92, 131, (photo. 26); Larochelle, 1986c: 43, 47, and 1987b: 55; Leng, 1902a: 116, 173, 174,

1902e: 248, 1912: 15, 1915: 562, and 1920: 41; Pearson et al., 1997: 38; Schaeffer, 1918: 116; Schaupp, 1884a: 84; Schilder, 1953b: 558; Wiesner, 1992: 216; Willis, 1968: 310.

REDESCRIPTION: Leng, 1902a: 174, (pl. II); Schaupp, 1884a: 105.

BIOLOGY: Cartwright, 1935: 73; Freitag and Tropea, 1969: 20; Knisley and Schultz, 1997: 92, 131, (photo. 26); Larochelle, 1974c: 33, 1977b: 55; Mitchell, 1902: 110; Stamatov, 1971: 4.

HABITAT: Active at twilight and during the night; habitat unknown (Wickham, 1899d: 225).

Subgenus EUNOTA Rivalier

Eunota Rivalier, 1954: 259 (as genus). Type-species: *Cicindela togata* LaFerté-Sénectère (orig. des.).

TAXONOMY: Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Rivalier, 1954: 250, 259, 1963: 48, and 1971: 142; Wiesner, 1992: 214.

togata fascinans Casey, 1914a: 23 (as species). NM: Santa Rosa.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Harris, E.D. and Leng, 1916: 18; Horn, W., 1915: 444, 1926: 300, and 1930: 86; Hutchings, 1986: 3, 4; Larochelle, 1979: 15; Leng, 1920: 43; Schilder, 1953b: 560; Wiesner, 1992: 214; Willis, 1967: 286.

BIOLOGY: Johnson, W.N., 1975b: 35, 1977: 18, 19, and 1978a: 28; Larochelle, 1977b: 56; Rumpp, 1962: 170; Schultz, 1986: 144.

HABITAT: Damp alkaline flats of an alkaline sink (Lawton and Willis, 1974: 60).

togata globicollis Casey, 1913: 35 (as species). KS: Clark Co.; CO/ NE KS/ NM TX OK.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

apicalis Horn, W., 1897: 17 (as variety of *C. togata* LaFerté-Sénectère; preoccupied *C. apicalis* Chaudoir, 1843: 691). NE KS: Kakley [sic].

TYPE DEPOSITORY: IPZE (syntypes).

latilabris Willis, 1967: 286 (new name for *C. apicalis* Horn, W.). The Kansas locality is spelled Kackley.

IMMATURE STAGES: Valenti, 1996b: 47; Willis, 1967: 170, (figs. 53-58).

TAXONOMY: Acciavatti et al., 1979: 31; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Bruner, 1901: 98; Döbler, 1973: 358; Drew and Van Cleave, 1961: 105, 116, (fig. 8); Fall and Cockerell, 1907: 155; Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 51, 58; Harris, E.D. and Leng, 1916: 18; Horn, W., 1915: 396, 1926: 300, 1930: 86, and 1938: 51, (pl. 82, fig. 28; pl. 83, fig. 1); Huber, 1969a: 19, and 1986: 56; Kippenhan, 1990a: 312, and 1994: 22, 72, (fig. 50); Knaus, 1884b: 64, 1886: 87, 1900a: 115, 1913: 89, and 1924b: 171; Larochelle, 1977c: 73, 1979: 15, 1986c: 42, and 1987a: 29; Leng, 1902a: 171, and 1920: 43; Rivalier, 1954: 260; Schilder, 1953b: 560; Snow, 1903: 192; Wickham, 1898a: 23; Wiesner, 1992: 214; Willis, 1967: 285, and 1970: 6, (fig. 22).

BIOLOGY: Johnson, W.N., 1975a: 21, 1975b: 34, 1977: 18, and 1978a: 28; Lantz, 1905: 260; Larochelle, 1977b: 56; Lawton, 1972b: 47; Lawton and Willis, 1974: 60, 61; Meserve, 1936: 274; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 414; Schultz, 1986: 144; Smyth, 1905: 429-430; Spomer and Higley, 1993: 394; Willis, 1967: 145, and 1974: 4; Willis and Stamatov, 1971: 50; Wilson, D.A., 1975: 45.

HABITAT: Moist saline ditches or drier saline flats (Willis and Stamatov, 1971: 50).

togata togata LaFerté-Sénectère, 1841: 40 (as species). TX; TX/ LA MS AL SC FL; Mex.

TAXONOMY: Bates, 1881: 12; Blackwelder, 1944: 20; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Cazier, 1954: 297, (figs. 127, 222); Ciegler, 1997: 180, 191, (fig. 22); Cresson, 1861: 19; Fall, 1895: 178; Fleutiaux, 1892: 82; Gaumer, 1969a: 10, 14, (fig. 20); Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 28; Graves and Pearson, 1973: 160, 162, 185, (fig. 24); Harris, E.D., 1911: 57; Harris, E.D. and Leng, 1916: 18; Horn, G.H., 1892: 26, (fig. 6); Horn, W., 1915: 395, 1926: 299, 1930: 86, and 1938: 51, (pl. 82, fig. 27); Horn, W. et al., 1897: 183; Kirk, 1970: 8; Knaus, 1908: 91; Knisley and Schultz, 1997: 91, 131, (photo. 27); LaFerté-Sénectère, 1841: 95; Larochelle, 1977b: 56, 1978e: 38, 1979: 15, 1986c: 45, and

1987a: 29; LeConte, 1848: 184, 1858: 27, and 1860: 58, (fig. 59); Leng, 1902a: 116, 170, 1915: 563, and 1920: 43; Löding, 1910: 131; Pearson et al., 1997: 38; Rivalier, 1954: 260, (fig. 5a); Schaupp, 1884a: 84, 104, (pl. 4, fig. 100); Schilder, 1953b: 560; Valenti, 1986a: 5; Wiesner, 1992: 214; Willis, 1967: 145, 285, (figs. 152-154), and 1968: 308.

REDESCRIPTION: Leng, 1902a: 170, (pl. IV); Schaupp, 1884a: 104.

BIOLOGY: Acciavatti, 1973: 25; Cartwright, 1935: 75; Freitag and Tropea, 1971: 54; Graves and Pearson, 1973: 185; Johnson, W.N., 1975a: 23, 24; Kirk, 1970: 8; Knisley and Schultz, 1997: 91, 131, (photo. 27); Kritsky and Simon, 1995: 146; Larochelle, 1974c: 33, 1977b: 56, and 1978e: 38; Lawton, 1972b: 45; Lawton and Willis, 1974: 63, 64; Meserve, 1936: 273; Niemelä and Ranta, 1993: 87; Pearson, 1988: 129; Pearson et al., 1988: 414; Vaurie, 1950b: 152; Vogt, 1949: 9; Wickham, 1899d: 225, and 1900a: 82; Willis, 1967: 145, 285.

HABITAT: Saline situations, both on seacoast and inland where such habitats exist (Graves and Pearson, 1973: 185).

Subgenus MICROTHYLAX Rivalier

Microthylax Rivalier, 1954: 260 (as genus). Type-species: *Cicindela digueti* Horn, W. (orig. des.).

TAXONOMY: Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Rivalier, 1954: 250, 260, 1963: 48, and 1971: 142; Wiesner, 1992: 213.

olivacea Chaudoir, 1854: 118 (as species). Cuba; FL; W. Indies.

TAXONOMY: Blackwelder, 1944: 19; Bousquet and Larochelle, 1993: 66; Boyd et al., 1982: 15; Chaudoir, 1865: 30; Chevrolat, 1863: 185; Dunn, G.A., 1986a: 10; Fleutiaux, 1892: 61; Freitag, 1992: 153, 156; Gemminger and Harold, 1868: 23; Horn, W., 1915: 402, 1926: 304, and 1938: 52, (pl. 84, figs. 7, 8); Larochelle, 1989a: 26; Leng and Mutchler, 1916: 689, 692, and 1917: 194; Pearson et al., 1997: 38; Rivalier, 1954: 260; Schilder, 1953b: 560; Stamatov, 1966: 118; Valenti, 1986a: 3; Wendler-Funaro, 1969: 17; Wiesner, 1992: 214; Willis, 1968: 311, 312; Woodruff and Graves, 1963: 79.

REDESCRIPTION: Woodruff and Graves, 1963: 79.

BIOLOGY: Larochelle, 1977b: 54, and 1980c: 48; Woodruff and Graves, 1963: 79.

HABITAT: Beaches composed of coarse sand coral, broken shells with rocky shorelines of limestone and fossil coral: prefer rocks, occasionally on sandy areas (Woodruff and Graves, 1963: 80).

Subgenus OPILIDIA Rivalier

Opilidia Rivalier, 1954: 261 (as genus). Type-species: *Cicindela macrocnema* Chaudoir (orig. des.).

TAXONOMY: Bousquet and Larochelle, 1993: 67.

chlorocephala smythi Harris, E.D., 1913a: 67, fig. 1 (as species). TX: Oceanside of Padre Isl.; TX.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 15; Cazier, 1954: 293; Gaumer, 1969a: 7, 12, (fig. 4); Gaumer and Murray, 1971: 10; Harris, E.D. and Leng, 1916: 16; Horn, W., 1915: 392, 1926: 295, 1930: 85, and 1938: 51, (pl. 81, fig. 26); Larochelle, 1986c: 39; Leng, 1920: 42; Pearson et al., 1997: 38; Rivalier, 1954: 261; Robinson and Murray, 1980: 27; Schilder, 1953b: 561; Wiesner, 1992: 217; Willis, 1968: 306.

BIOLOGY: Huber, 1989: 12.

HABITAT: E.G. Smith found adults on sand on oceanside of Padre Isl., TX (Harris, E.D., 1913a: 67).

Subgenus BRASIELLA Rivalier

Brasiella Rivalier, 1954: 261 (as genus). Type-species: *Cicindela argentata* Fabricius (orig. des.).

TAXONOMY: Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 15; Freitag and Barnes, 1989: 249, 254; Huber, 1986: 57; Mandl, 1963: 581; Rivalier, 1954: 250, 261, 1963: 48, and 1971: 142; Wiesner, 1992: 202.

wickhami Horn, W., 1903a: 182 (as species). AZ: Tucson; AZ; Mex.

TYPE DEPOSITORY: IPZE (syntypes).

lemnisticta Smyth, 1908: 188 (as species). AZ: Valley of San Bernardino Creek, 20 mi. E. of Douglas.

TAXONOMY: Bertholf, 1983: 7, 27, (fig. 32); Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Cazier, 1948: 18, (fig. 14), and 1954: 286, (figs. 102, 197); Döbler, 1973: 418; Freitag and Barnes, 1989: 339, 359; Harris, E.D., 1911: 51; Harris, E.D. and Leng, 1916: 13; Horn, W., 1903b: 214, 219, 1915: 388-389, 1926: 290, 1930: 85, and 1938: 50, (pl. 80, fig. 10); Hutchings, 1986: 3; Leng, 1920: 42; Pearson et al., 1997: 35; Rivalier, 1954: 263, and 1955: 97, 98, (fig. 8); Schilder, 1953b: 558; Smyth, 1908: 188; Vaurie and Vaurie, 1953: 84; Wiesner, 1992: 203; Willis, 1968: 307.

BIOLOGY: Larochelle, 1977b: 56; Pearson and Cassola, 1992: 380; Smyth, 1908: 188; Spangler, H.G., 1988: 450.

HABITAT: Little used roads in forested areas (Cazier, 1954: 286).

Subgenus CYLINDERA Westwood

Cylindera Westwood, 1831: 300 (as genus). Type-species: *Cicindela germanica* Linnaeus (orig. des.).

Eumecus Motschulsky, 1850: 4 (as genus). Type-species: *Cicindela germanica* Linnaeus (des. by Motschulsky, 1862: 22).

TAXONOMY: Acciavatti and Pearson, 1989: 100; Bedel, 1881: 6; Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Cassola and Nidek, 1984: 14; Freitag and Barnes, 1989: 249; Horn, W., 1915: 236, and 1926: 134; Rivalier, 1950: 222, 231, 1954: 251, 264, 1957: 314, 322, 1961: 122, 138, 1963: 47, and 1971: 142; Schilder, 1953b: 547; Sumlin, 1981: 274, 279; Vidal Sarmiento, 1959: 234, and 1966a: 259; Wiesner, 1992: 179.

celeripes LeConte, 1848: 183 (as species). Kansas River, Republican Fork; NE KS IA IL IN?/ TX OK.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bates, 1890: 509; Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Bruner, 1901: 98; Cresson, 1861: 10; Downie and Arnett, 1996: 79, 83; Drew and Van Cleave, 1961: 103, 107, (fig. 10); Eckhoff, 1939: 204, 220; Fleutiaux, 1892: 41; Gemminger and Harold, 1868: 11; Graves and Pearson, 1973: 196; Harris, E.D., 1911: 51; Harris, E.D. and Leng, 1916: 14; Horn, W., 1903a: 182, 1906: 333, 1915: 389, 1926: 291, 1930: 85, and 1938: 50, (pl. 80, fig. 15); LeConte, 1848: 183, and 1860: 60, (fig. 62); Leng, 1902a: 115, 117, and 1920: 42; Leng and Beutenmüller, 1894a: 43, and 1894b: 88, 90, (fig. 3); Pearson et al., 1997: 37; Rivalier, 1954: 265; Schaupp, 1884a: 79, 85; Schilder, 1953b: 559; Wickham, 1911: 5; Wiesner, 1992: 186; Willis, 1968: 308, (fig. 15).

REDESCRIPTION: Leng, 1902a: 117, (pl. II, III).

BIOLOGY: Lantz, 1905: 253; Leng, 1902a: 117; Meserve, 1936: 273; Pearson et al., 1988: 414; Wickham, 1899d: 209; Willis, 1970: 2, (fig. 2).

HABITAT: Dry, sandy, loamy soils covered with short cropped grass in open prairie land, gullies, clay soils (Wickham, 1899d: 209); railroad embankments (Willis, 1970: 2); moist, bare soil near streams (Montgomery and Montgomery, 1931: 359).

cursitans LeConte, 1860: 60, fig. 63 (as species). Fort Riley; ND SD/ NE KS IA IL IN KY/ AR LA MS AL TN. Two paratypes (no. 1773) are deposited in SEMC.

TYPE DEPOSITORY: MCZC.

alata Liljeblad, 1932: 215 (as species). IL: Chicago. A female allotype is deposited in FMNH.

TYPE DEPOSITORY: FMNH.
SEX OF TYPE: M.

TAXONOMY: Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Bruner, 1901: 98; Byers and Karren, 1968: 3; Cresson, 1861: 11; Dobler, 1973: 356; Eckhoff, 1939: 204, 221; Fleutiaux, 1892: 41; Gemminger and Harold, 1868: 13; Graves and Brzoska, 1991: 4, 5, 26, (fig. 30); Graves and Pearson, 1973: 160, 163, 186, (fig. 26); Harris, E.D., 1911: 51; Harris, E.D. and Leng, 1916: 14; Horn, W., 1903a: 182, 1906: 333, 1915: 389, (pl. 19, fig. 9), 1930: 85, 1935: 66, and 1938: 50, (pl. 80, fig. 16); Kippenhan, 1994: 23, 75, (fig. 44), and 1995b: 52; Kirk and Balsbaugh, 1975: 13; Knaus, 1900a: 110; Knisley et al., 1987a: 281, 283; Larochelle, 1986a: 14, and 1987a: 29; Larson, P.R., 1981: 52; LeConte, 1860: 60; Leng, 1902a: 117, 1915: 563, and 1920: 42; Leng and Beutenmüller, 1894a: 43, and 1894b: 90; Mather, 1971: 22; Pearson et al., 1997: 37; Popenoe, 1877: 22; Rivalier, 1954: 265; Schaupp, 1884a: 85, (pl. 1, fig. 14); Schilder, 1953b: 559; Valenti, 1986a: 1; Wickham, 1911: 5; Wiesner, 1992: 186; Willis, 1968: 310, (fig. 16), and 1970: 8, (fig. 27).

BIOLOGY: Cutler, 1970: 10, and 1973: 77; Graves and Brzoska, 1991: 26; Graves and Pearson, 1973: 186; Johnson, W.N., 1972: 20, and 1975b: 34; Larochelle, 1974c: 24; Leng, 1902a: 118; Meserve, 1936: 273; Vaurie, 1950b: 145; Wickham, 1899d: 210.

HABITAT: Yellow sand, open timber, streambanks (Leng, 1902a: 118); clay loam with patchy alkaline crusts (Cutler, 1973: 77).

debilis Bates, 1890: 509, pl. 16, fig. 12 (as species). Ciudad in Durango; AZ NM TX; Mex.

TYPE DEPOSITORY: IPZE (syntypes).

segnis Harris, E.D., 1913a: 69, fig. 3 (as variety of *C. debilis* Bates). AZ: Sonoita.

TYPE DEPOSITORY: MCZC.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 540, (figs. 98-103); Valenti, 1996b: 49.

TAXONOMY: Acciavatti et al., 1979: 31; Bertholf, 1983: 8, (fig. 3); Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Cazier, 1954: 287, (figs. 103, 198); Dobler, 1973: 372; Fleutiaux, 1892: 41; Harris, E.D., 1911: 52; Harris, E.D. and Leng, 1916: 14; Horn, W., 1903b: 219, 1915: 389, 1926: 291, 1930: 85, and 1938: 50, (pl. 80, fig. 14); Horn, W. et al., 1897: 182; Larochelle, 1986c: 39; Leng, 1920: 42; Pearson et al., 1997: 37; Rivalier, 1954: 265; Schilder, 1953b: 559.

BIOLOGY: Johnson, W.N., 1975b: 35; Larochelle, 1985: 68; Lawton and Willis, 1974: 56, 58; Pearson, 1985: 67; Pearson and Juliano, 1991: 224; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson and Mury Meyer, 1979: 561; Pearson and Stemberger, 1980: 374; Smyth, 1934: 102; Sumlin, 1974: 20.

HABITAT: Dry sandy fields with weeds, semi-moist ground (Cazier, 1954: 287).

lemniscata lemniscata LeConte, 1854b: 220 (as species). San Diego trip; CA/ UT/ AZ NM; Mex.

TYPE DEPOSITORY: MCZC.
SEX OF TYPE: M.

IMMATURE STAGES: Knisley, 1985b: 481, and 1987: 1191; Knisley and Juliano, 1988: 1983; Knisley and Pearson, 1984: 465, 542, (figs. 104-109); Valenti, 1996b: 49.

TAXONOMY: Bates, 1884: 258; Bertholf, 1983: 7, 12, (fig. 8); Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Cazier, 1948: 15, (fig. 13), 1954: 263, (fig. 13), and 1960: 11; Cresson, 1861: 14; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 107; Gemminger and Harold, 1868: 20; Harris, E.D., 1911: 41; Harris, E.D. and Leng, 1916: 11; Horn, G.H., 1892: 27, (fig. 16), and 1894: 307; Horn, W., 1903b: 220, 1915: 384, 385, 1926: 285, 1930: 84, and 1938: 50, (pl. 77, figs. 27, 28); Horn, W. et al., 1897: 184; Hutchings, 1986: 3; Knaus, 1904: 153; Knisley and Pearson, 1984: 542; Larochelle, 1977c: 70; LaRue, 1994b: 1; LeConte, 1858: 27, and 1860: 59, (fig. 61); Leng, 1902a: 116, 174, (pl. II), and 1920: 41; Murray, 1979: 52; Papp, H., 1952: 505; Pearson et al., 1997: 37; Rivalier, 1954: 265; Schaupp, 1884a: 83, 103, (pl. 4, fig. 97); Schilder, 1953b: 558; Shook, 1989: 1, (fig. 1); Sumlin, 1976a: 106; Tanner, V.M., 1927: 10, (figs. 202, 209), and 1929: 86; Vaurie and Vaurie, 1953: 84; Wiesner, 1992: 184; Willis, 1968: 307.

REDESCRIPTION: Leng, 1902a: 174; Schaupp, 1884a: 103.

BIOLOGY: Andrews, F.G. et al., 1979: 30; Johnson, W.N., 1975b: 35, 1977: 18, and 1978a: 29; Kritsky and Simon, 1995: 146; Larochelle, 1975a: 3, 1977b: 52, and 1980b: 42; Lawton and Willis, 1974: 57, 58; Murray, 1979: 52; Pearson, 1985: 67; Pearson and Juliano, 1991: 224; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 250; Pearson and Mury Meyer, 1979: 561; Pearson and Stemberger, 1980: 374; Pearson et al., 1988: 414; Richman, 1967: 89; Shelly and Pearson, 1978: 791; Smyth, 1905: 430, and 1908: 187-188; Spangler, H.G., 1988: 448; Stamatov, 1971: 4; Vogt, 1949: 6; Wickham, 1893: 392, 1899d: 224, 1900a: 82, and 1901: 21.

HABITAT: Banks of streams, ponds, dry lakebeds, also away from water among grasses in sandy or clay soils; commonly collected at night around lights (Cazier, 1954: 263).

lemniscata rebaptisata Vaurie, 1951: 12 (as replacement name for *C. lemniscata rufipes* Vaurie). TX: Culberson Co., Van Horn; NM TX; Mex.

rufipes Vaurie, 1950a: 5 (as subspecies of *C. lemniscata* LeConte; preoccupied Dejean, 1825: 22). TX: Culberson Co., Van Horn. A female allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Acciavatti et al., 1979: 31; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 16; Cazier, 1954: 263, 264, (figs. 63, 163); Gaumer and Murray, 1971: 10; Huber, 1969a: 22, and 1986: 57; Hutchings, 1986: 3, 4; Kippenhan, 1995b: 54; Murray, 1979: 52; Nidek, 1978: 43; Schilder, 1953b: 558; Shook, 1989: 1, (fig. 1); Valenti, 1986a: 2; Vaurie, 1951: 12; Wiesner, 1992: 184.

BIOLOGY: Gaumer, 1973: 14; Johnson, W.N., 1975a: 23, 1977: 18, 19, and 1978a: 29; Larochelle, 1977b: 52; Lawton and Willis, 1974: 61; Murray, 1979: 52; Robinson, 1975: 36; Rumpp, 1962: 170.

HABITAT: After 9:30 p.m. at lighted places in the desert town of Van Horn. One specimen was taken by day in a dry creek bed (Vaurie, 1950a: 6).

terricola cinctipennis LeConte, 1848: 182 (as species). Habitat beside Rocky Mts.; YT/ AB SK MT ND SD/ WY UT CO/ NE/ AZ NM.

TYPE DEPOSITORY: MCZC.

cyanella LeConte, 1860: 46 (as species). (Montana?) Yellowstone R.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Beaulne, 1914: 123; Bertholf, 1983: 8, 25, (fig. 29); Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 67, 68; Boyd et al., 1982: 16; Bruner, 1901: 98; Cresson, 1861: 11; Ducey, 1985: 3; Dunn, G.W., 1891: 154; Evans, J.E., 1903: 240; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 65; Gemminger and Harold, 1868: 12; Gibson, 1918: 99; Harris, E.D., 1911: 50; Harris, E.D. and Leng, 1916: 14; Hatch, 1953: 42; Hilchie, 1985: 322, 332, (fig. 25); Hooper, 1969: 4; Horn, W., 1903a: 193, 196, 1915: 390, 1926: 292, 293, 1930: 85, and 1938: 50, (pl. 80, figs. 24-27); Horn, W. et al., 1897: 182; Johnson, W.N., 1990c: 1-10, (figs. 1, 4-9); Kippenhan, 1990a: 312, and 1994: 73, (fig. 51); Knowlton and Wood, 1946: 91; Lantz, 1905: 258; Larochelle, 1977c: 73, 1987a: 24, and 1989b: 43; Larson, P.R., 1981: 52; LeConte, 1848: 182, and 1860: 45, 46, (figs. 30, 31); Leffler, 1979a: 590, and 1987: 10; Leng, 1902a: 154, 155, and 1920: 42; Papp, H., 1952: 505; Pearson et al., 1997: 37; Rivalier, 1954: 265; Schaupp, 1884a: 81, 82, 95, 96, (pl. 3, figs. 68, 69, 72; pl. 5, fig. 138); Schilder, 1953b: 559; Snow, 1877b: 16; Tanner, V.M., 1929: 87; Valenti, 1986a: 4; Wallis, 1961: 64, 70, (pl. 4, fig. 102); Wickham, 1899b: 121, and 1899c: 197; Wiesner, 1992: 184.

REDESCRIPTION: Leng, 1902a: 155, (pl. IV).

BIOLOGY: Ducey, 1985: 3; Hilchie, 1985: 332; Johnson, W.N., 1975b: 35, 1977: 18, and 1978a: 28, 29; Knisley, 1984: 93; Lawton and Willis, 1974: 49; Meserve, 1936: 273; Rumpp, 1962: 171; Shook, 1981: 359; Wickham, 1899d: 220; Willis and Stamatov, 1971: 49.

HABITAT: Muddy plains near rivers, sandy roads, fields thinly wooded or grassy, along roads near springs, and banks of creeks (Wickham, 1899d: 220).

terricola imperfecta LeConte, 1851: 171 (as species). Northern; BC WA OR ID/ AB MT/ CA NV/ UT.

TYPE DEPOSITORY: MCZC.

continua Knaus, 1922: 195 (as new form of *C. pusilla imperfecta* LeConte). CA: Pine Knot, San Bernardino Mountains, beach of Baldwin Lake (8,500 ft.).

IMMATURE STAGES: Leffler, 1979a: 91; Valenti, 1996b: 48.

TAXONOMY: Beaulieu, 1900: 154; Beaulne, 1914: 123; Blackwelder, 1944: 18; Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Cresson, 1861: 14; Dunn, G.W., 1891: 154; Fletcher, J., 1907: 86; Fletcher, J. and Gibson, 1908: 113; Fleutiaux, 1892: 65; Gemminger and Harold, 1868: 19; Harris, E.D., 1911: 50; Harris, E.D. and Leng, 1916: 14; Hatch, 1938: 236, (fig. 19), and 1953: 42, (pl. III, fig. 19); Hilchie, 1985: 322, 332, (fig. 26); Horn, G.H., 1866: 397, and 1892: 27, (fig. 16); Horn, W., 1902b: 392, 1903a: 193, 1915: 33, (fig. 107), 390, 1926: 292, 1930: 85, and 1938: 50, (pl. 80, figs. 21-23); Horn, W. et al., 1897: 182; Johnson, W.N., 1990c: 1-10, (figs. 1, 10-13); Knowlton and Wood, 1946: 93; LaRivers, 1946: 140; Larochelle, 1986c: 42, and 1987a: 31-33; LeConte, 1860: 45, (fig. 28); Leffler, 1979a: 599, and 1987: 10; Leffler and Pearson, 1976: 57; Leng, 1902a: 154, 156, (pl. IV), and 1920: 42; Leng and Mutchler, 1927: 7; Maser and Beer, 1984: 48, (fig. 19); Rumpp, 1956a: 139; Schaupp, 1884a: 82, 97, (pl. 3, fig. 70; pl. 5, figs. 139-141); Schilder, 1953b: 559; Shook, 1984: 159; Sumlin, 1976a: 106; Tanner, V.M., 1927: 10, (figs. 3, 4, 199, 220), and 1929: 87; Venables, 1913: 267; Wallis, 1961: 64, 70, (pl. 4, fig. 101); Wickham, 1894: 154; Wiesner, 1992: 184.

BIOLOGY: Freitag and Tropea, 1971: 55; Frick, 1957: 503; Hilchie, 1985: 332; Hussain, 1975: 226; Johnson, W.N., 1975a: 22, 23, and 1975b: 34; Larochelle, 1974c: 29; Lawton and Willis, 1974: 52-54; Wickham, 1899d: 220; Willis and Stamatov, 1971: 49.

HABITAT: Sandy clay soil along river banks in eastern British Columbia (Wallis, 1961: 65); lake beaches (Knaus, 1922: 195).

terricola kaibabensis Johnson, W.N., 1990c: 4, figs. 16-21 (as subspecies of *C. pusilla* Say). AZ: Coconino Co., 8 mi. north of Kaibab Lodge; AZ.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 67; Wiesner, 1992: 184.

HABITAT: Grassy meadows of the Kaibab Plateau of northern Arizona (Johnson, W.N., 1990c: 5).

terricola lunalonga Schaupp, 1884b: 122, fig. p. 122 (as species). CA: Sierra Nevada; CA NV; Mex.

tuolumnae Leng, 1902a: 157 (as variety of *C. pusilla* Say). CA: Tuolumne Co., Hetch Hetchy Valley. Syntypes are deposited in IPZE.

TYPE DEPOSITORY: AMNH (lectotype).

SEX OF TYPE: F.

tularensis Casey, 1914a: 19 (as species). CA: Tulare Co.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: FM.

wagneri Cazier, 1937b: 117 (as variety of *C. pusilla*). CA: Fresno Co., Friant. A male allotype, reportedly in the collection of Wagner, is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: F.

TAXONOMY: Blackwelder, 1939: 8, and 1944: 19; Bousquet and Larochelle, 1993: 67; Boyd et al., 1982: 16; Cazier, 1939a: 28, 1948: 17, (fig. 15), and 1954: 287, (figs. 105, 200); Dahl, 1941: 191; Dobler, 1973: 416; Douglas, 1996: 10; Fleutiaux, 1892: 97; Harris, E.D., 1911: 50; Harris, E.D. and Leng, 1916: 14; Hatch, 1953: 42; Horn, G.H., 1892: 27; Horn, W., 1893: 340, 1903a: 193, 197, 1903b: 214, 219, 1915: 33, (fig. 93), 390, 444, 1926: 293, 1930: 85, and 1938: 50, (pl. 80, fig. 28); Johnson, W.N., 1990c: 1; Larochelle, 1986a: 13, and 1987b: 58; Leng, 1902a: 154, 157, (pl. IV), and 1920: 42; Rivalier, 1954: 264, (fig. 7a), 265; Schilder, 1953b: 559; Wiesner, 1992: 184.

BIOLOGY: Lawton and Willis, 1974: 54; Wickham, 1899d: 220.
HABITAT: Shady paths, streams and meadows; banks of San Joaquin River (Cazier, 1937b: 118).

terricola terricola Say, 1824: 269 (as species). Inhabits Northwest Territory; SK MB ND SD/ MN/ CO/ NE KS IA.

pusilla Say, 1817: 21 (as species; preoccupied Schreber, 1759: 10). Inhabits the Missouri, above the river Platte.

sayanella Casey, 1914a: 19 (as subspecies of *C. pusilla* Say). NE: Sioux Co., Monroe Canyon.

TYPE DEPOSITORY: USNM.

TAXONOMY: Acciavatti et al., 1979: 31; Beaulieu, 1900: 154; Beaulne, 1914: 122; Blackwelder, 1939: 8, and 1944: 19; Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 16; Bruner, 1901: 98; Cazier, 1954: 287; Chaudoir, 1865: 29; Cresson, 1861: 17, 19; Dawson and W. Horn, 1928: 7; Dejean, 1837: 5; Fletcher, J., 1902: 99, and 1906: 90; Fletcher, J. and Gibson, 1908: 108, and 1909: 99; Fleutiaux, 1892: 65; Gemminger and Harold, 1868: 24; Gibson, 1910: 110, 1913: 113, and 1916: 194; Harris, E.D., 1911: 49; Harris, E.D. and Leng, 1916: 14; Hatch, 1953: 42; Hooper, 1969: 4; Horn, G.H., 1866: 397, 1892: 27, and 1894: 306; Horn, W., 1903a: 193, 1915: 390, 444, 1926: 292, 1928: 12, 1930: 85, and 1938: 50, (pl. 80, figs. 19, 20); Horn, W. et al., 1897: 182; Huber, 1969a: 21, and 1986: 57; Johnson, W.N., 1990c: 1-10, (figs. 1-3); Kippenhan, 1990a: 312, and 1994: 23, 73; Kirk and Balsbaugh, 1975: 13; Knowlton and Wood, 1946: 91; Larochelle, 1987a: 23, 33, and 1989b: 42-45; Larson, P.R., 1981: 52; LeConte, 1848: 182, 184, and 1860: 45, 61, (fig. 29); Leng, 1902a: 154, 155, (pl. IV), and 1920: 42; Pearson et al., 1997: 37; Rivalier, 1954: 265; Say, 1818: 424; Schaupp, 1884a: 81, 95, (pl. 5, fig. 136); Schilder, 1953a: 313, and 1953b: 559; Wallis, 1961: 13, 61, 70, (pl. 4, figs. 97-100); Wickham, 1894: 154; Wiesner, 1992: 183, 184; Willis, 1968: 311, and 1970: 8.

BIOLOGY: Criddle, 1907: 113, and 1910: 15; Cutler, 1970: 10; Freitag and Tropea, 1969: 23; Meserve, 1936: 273; Vaurie, 1950b: 151; Wickham, 1899d: 220; Willis and Stamatov, 1971: 49.

HABITAT: Alkaline or saline areas with sparse vegetation or bare spots are favored by the prairie populations of this species (Wallis, 1961: 65).

unipunctata Fabricius, 1775: 225 (as species). America; IA MO IL IN OH KY/ NY PA NJ MD DC WV VA/ AR MS AL TN GA SC NC.

IMMATURE STAGES: Hamilton, C.C., 1925: 19, 43, (figs. 71, 108, 138); Valenti, 1996b: 47.

TAXONOMY: Acciavatti et al., 1992: 53, 71, (fig. 15); Anonymous, 1917: 94; Arnett, 1993: 287, (fig. 24.29); Blatchley, 1910: 30, 31, (fig. 10); Bousquet and Larochelle, 1993: 68; Boyd, 1973: 7, 1978: 198, 231, (fig. 22), and 1985: 105; Boyd et al., 1982: 16; Ciegler, 1997: 184, 191, (fig. 4); Cresson, 1861: 19; Crowe, 1937a: 38; Davis, W.T., 1911a: 216, 1912a: 19, 1915d: 156, 1916a: 100, and 1920: 90; Dawson and W. Horn, 1928: 7; Dejean, 1825: 50, and 1837: 3; Dillon and Dillon, 1961: 51, 58, (pl. VI, fig. 2); Downie and Arnett, 1996: 79, 84, (fig. 3.22); Eckhoff, 1939: 204, 206, 221; Edwards, J.G., 1949: 73; Fabricius, 1787: 186, 1792: 174, and 1801: 238; Fattig, 1935: 155, and 1951: 72; Fleutiaux, 1892: 92; Franklin, 1988: 249; Gemminger and Harold, 1868: 28; Gistl, 1837: 29; Glaser, 1984: 66, 74; Graves and Brzoska, 1991: 4, 5, 25, (fig. 29); Graves and Pearson, 1973: 160, 163, 185, (fig. 25); Harris, E.D., 1911: 52; Harris, E.D. and Leng, 1916: 14; Harris, T.W., 1852: 1, (fig. S); Hood, J.D., 1931: 139; Horn, W., 1906: 333, 1915: 389, 1926: 291, 1928: 12, 1930: 85, and 1938: 50, (pl. 80, fig. 18); Kirk, 1969: 7, and 1970: 8; Knisley and Schultz, 1997: 92, 135, (photo. 30); Knisley et al., 1987a: 282, 283, (fig. 7A); Kritsky et al., 1996: 29; Larochelle, 1977c: 65-73, 1986c: 35-47, and 1987b: 51, 55; LeConte, 1848: 175, and 1860: 32, (fig. 4); Leng, 1902a: 115, 119, (pl. II), 1910a: 73, 1912: 14, 1915: 563, and 1920: 42; Leng and Beutenmüller, 1893: 92, and 1894b: 88, 90, (fig. 2); Liebeck, 1890: 158; Linnaeus, 1788: 1921; Mather, 1971: 22; Melsheimer, 1806: 46; Montgomery and Montgomery, 1931: 359; Pearson et al., 1997: 37; Rivalier, 1954: 265; Say, 1818: 412; Schaeffer, 1902: 248, and 1919: 344; Schaupp, 1878b: 28, and 1884a: 79, 86, (pl. 1, fig. 18); Schilder, 1953b: 559; Sherman, F., 1904: 27; Weeks, 1905: 342; Wickham, 1911: 5; Wiesner, 1992: 186; Willis, 1968: 310, and 1970: 9; Wolcott, 1896: 234.

REDESCRIPTION: Leng, 1902a: 119.

BIOLOGY: Acciavatti et al., 1992: 71; Blatchley, 1910: 31; Boyd, 1978: 231; Cartwright, 1935: 74; Davis, W.T., 1914a: 74; Franklin, 1988: 249; Glaser, 1984: 74; Graves and Brzoska, 1991: 25; Graves and Pearson, 1973: 185; King, I.N., 1914: 319; Knisley and Schultz, 1997: 92, 135, (photo. 30); Knisley et al., 1987a: 282; Larochelle, 1973a: 32, 1975a: 3, and 1989a: 19; Leng, 1902a: 119, 1902d: 237, and 1910: 73, 80; Sherman, F., 1908: 361; Smyth, 1908: 184-185; Thompson, W.C., 1915: 425; Wickham, 1899d: 210.

HABITAT: Forests, along footpaths: reluctant to fly, attempt to hide under leaves, may be caught with bare hands (Graves and Pearson, 1973: 185).

viridisticta arizonensis Bates, 1884: 260 (as variety of *C. viridisticta* Bates). North America, AZ; Mex., N. Sonora; AZ; Mex.

TYPE DEPOSITORY: BMNH.

IMMATURE STAGES: Knisley and Pearson, 1984: 465, 545, (figs. 110-115); Valenti, 1996b: 49.

TAXONOMY: Bertholf, 1983: 7, 27, (fig. 31); Blackwelder, 1939: 8; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 16; Cazier, 1954: 284, 285, (figs. 22, 99, 194); Fleutiaux, 1892: 40; Harris, E.D., 1911: 51; Harris, E.D. and Leng, 1916: 13; Horn, W., 1903a: 182, 193, 1903b: 214, 219, 1906: 333, 1915: 388, 389, 1926: 290, 1930: 85, 1935: 65, and 1938: 50, (pl. 80, fig. 9); Huber, 1986: 57; Hutchings, 1986: 3; Leng, 1902a: 175, (pl. II), and 1920: 42; Murray, 1979: 54; Pearson et al., 1997: 37; Rivalier, 1954: 265; Schilder, 1953b: 558; Wiesner, 1992: 185; Willis, 1968: 307.

BIOLOGY: Gaumer, 1970a: 8; Johnson, W.N., 1975a: 23; Knisley, 1985a: 337; Larochelle, 1974c: 33, and 1977b: 56; Lawton and Willis, 1974: 56; Pearson and Mury Meyer, 1979: 561; Smyth, 1908: 187; Spangler, H.G., 1988: 450; Wickham, 1900a: 82, and 1901: 21.

HABITAT: Alfalfa fields along irrigation ditches, shaded paths, river bottoms where grass is short and sparse (Cazier, 1954: 284); roadside ditch with tall grass (Gaumer, 1970a: 8).

Subgenus DROMOCHORUS Guérin-Méneville

Dromochorus Guérin-Méneville, 1845: 95 (as genus). Type-species: *Dromochorus pilatei* Guérin-Méneville (monotypy).

TAXONOMY: Arnett, 1963: 53; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 18; Casey, 1897: 293, and 1913: 4; Drew and Van Cleave, 1961: 107; Fleutiaux, 1886: 6, and 1892: 33; Horn, G.H., 1887: 208; Horn, W., 1915: 237, 396, and 1926: 301; Johnson, W.N., 1992: 49; Leng, 1902a: 110; Rivalier, 1954: 267, 1963: 47, and 1971: 142; Schilder, 1953b: 558; Wiesner, 1992: 208.

BIOLOGY: Leng, 1902a: 110.

belfragei Sallé, 1877: VII (*Dromochorus*) (as species). TX: Waco and Dallas; banks of Trinity River; NE KS/ TX OK; Mex.

pruinina Casey, 1897: 294 (*Dromochorus*) (as species). KS.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

sericea Casey, 1897: 294 (*Dromochorus*) (as species). TX.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 69, 70; Boyd et al., 1982: 18; Cazier, 1954: 297, (figs. 128, 223); Döbler, 1973: 409; Drew and Van Cleave, 1961: 103, 107; Fall, 1895: 178; Fleutiaux, 1892: 33; Gaumer, 1969a: 5, 12, (fig. 3); Gaumer and Murray, 1971: 11; Graves and Pearson, 1973: 192; Harris, E.D., 1911: 51; Harris, E.D. and Leng, 1916: 18; Horn, W., 1891a: 329, 1906: 333, 1915: 396, 1926: 301, 1930: 86, and 1938: 51, (pl. 83, fig. 6); Johnson, W.N., 1992: 53; Larochelle, 1979: 13, 1986c: 45, and 1987b: 55; Leng, 1902a: 110, and 1920: 43; Papp, H., 1952: 307; Pearson et al., 1997: 37; Rivalier, 1954: 268, (fig. 7d); Robinson, 1948: 27; Schaupp, 1884a: 85; Schilder, 1953b: 559; Wiesner, 1992: 208; Willis, 1968: 309, and 1970: 2, (fig. 1).

REDESCRIPTION: Leng, 1902a: 110.

BIOLOGY: Cooper, 1992: 5; Jones, 1884: 75; Knaus, 1900a: 110; Kuster, 1979: 297; Pearson, 1988: 135;

Pearson et al., 1988: 414; Wickham, 1899d: 209.

HABITAT: Mostly crepuscular; usually collected in black loamy ground or sodded dry fields some distance from water (Cazier, 1954: 297; Lawton, 1972b: 35, 44).

pilatei Guérin-Méneville, 1845: 96 (*Dromochorus*) (as species). TX: Velasco; TX/ LA.
maga LeConte, 1875: 161 (as species). LA: in woods near Lake Pontchartrain.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 70; Boyd et al., 1982: 18; Casey, 1897: 294; Cazier, 1954: 297; Cresson, 1861: 16; Fall, 1895: 178; Fleutiaux, 1892: 33; Gaumer, 1969a: 9, 14, (fig. 15); Gaumer and Murray, 1971: 11; Gemminger and Harold, 1868: 2; Graves and Pearson, 1973: 160, 163, 192, (fig. 34); Harris, E.D., 1911: 51; Harris, E.D. and Leng, 1916: 18; Horn, W., 1891a: 329, 1906: 333, 1915: 396, 1926: 301, 1930: 86, and 1938: 51, (pl. 83, fig. 5); Johnson, W.N., 1992: 52; Larochelle, 1979: 14, and 1980b: 40; LeConte, 1858: 27; Leng, 1902a: 111, and 1920: 43; Pearson et al., 1997: 37; Popenoe, 1978: 77; Rivalier, 1954: 268; Sallé, 1877: VIII; Schaupp, 1884a: 79, 85, (pl. 1, fig. 13); Schilder, 1953b: 559; Wiesner, 1992: 208; Willis, 1968: 309.

BIOLOGY: Graves and Pearson, 1973: 192; Kritsky and Simon, 1995: 146; Larochelle, 1977b: 54; Leng, 1902a: 111; Pearson, 1988: 135; Wickham, 1899d: 209.

HABITAT: Flightless, crepuscular and nocturnal; found on seldom used paths and in weeds near roads (Graves and Pearson, 1973: 192).

velutinigrens Johnson, W.N., 1992: 50, fig. 1 (as species). TX: Kleberg Co., 10 km east of Riviera; TX.

TYPE DEPOSITORY: CNCI.

SEX OF TYPE: M.

venetavelutinus Gage, 1992: 4, fig. p. 5 (as species). TX: Willacy Co., Port Mansfield, as part of the Pleistocene - Recent delta of the Rio Grande; TX.

TYPE DEPOSITORY: TXME.

SEX OF TYPE: F.

TAXONOMY: Bousquet and Larochelle, 1993: 70; Pearson et al., 1997: 37; Wiesner, 1992: 208.

HABITAT: Sandy road paths and grassy regions through semi-forested areas at Biological Station "Site 55" (Johnson, W.N., 1992: 52); coastal salt flats, salt marshes, gulf prairies and clay dunes (Gage, 1991b: 4).

Subgenus ELLIPSOPTERA Dokhtouroff

Ellipsoptera Dokhtouroff, 1883b: 70 (as subgenus of *Cicindela* Linnaeus). Type-species: *Cicindela hirtilabris* LeConte (design. by Horn, W., 1915: 236).

TAXONOMY: Arnett, 1963: 53; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Horn, W., 1915: 236, and 1926: 134; Rivalier, 1954: 251, 266, 1963: 47, and 1971: 142; Schilder, 1953b: 560; Wiesner, 1992: 206; Willis, 1971b: 13.

blanda Dejean, 1831: 238 (as species). North America; LA MS AL GA SC NC FL.
tarsalis LeConte, 1852: 66 (as species). GA: Canootchee River.

TYPE DEPOSITORY: MCZC.

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Bradley, 1914: 80; Choate, 1975: 74; Ciegler, 1997: 180, 186, (fig. 21); Cresson, 1861: 10; Davis, W.T., 1916b: 154; Fattig, 1935: 154; Fleutiaux, 1892: 87; Gemminger and Harold, 1868: 10; Gistl, 1837: 48; Graves and Pearson, 1973: 160, 162, 188, (fig. 28); Harris, E.D., 1911: 56; Harris, E.D. and Leng, 1916: 17; Harris, T.W., 1852: 1; Horn, W., 1903a: 187, 1915: 394, 1926: 297, 1930: 86, and 1938: 51, (pl. 82, fig. 13); King, B.L., 1988: 43; Kirk, 1969: 8, and 1970: 8; Knisley and Schultz, 1997: 91, 101, (photo. 5); Larochelle, 1979: 13, and 1986c: 34, 36, 44; Lawton,

1970b: 1, 6, 7; LeConte, 1848: 180, 1852: 65, 66, and 1860: 49, 50, (fig. 38); Leng, 1902a: 163, 1912. 16, 1913: 312, 1915: 563, and 1920: 42; Löding, 1910: 131; Mather, 1971: 21; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 101, (pl. 5, fig. f); Schilder, 1953b: 560; Sherman, F., 1904: 31; Wiesner, 1992: 206; Willis, 1968: 308, (fig. 11).

REDESCRIPTION: Leng, 1902a: 163, (pl. IV).

BIOLOGY: Cartwright, 1935: 75; Choate, 1975: 74; Freitag and Tropea, 1969: 17; Graves and Pearson, 1973: 188; Johnson, W.N., 1972: 20; Kirk, 1969: 8, and 1970: 8; Knisley and Schultz, 1997: 91, 101, (photo. 5); Larochelle, 1977b: 50; Valenti, 1986b: 23; Wickham, 1899d: 223; Wilson, D.A., 1975: 49.

HABITAT: Sandbars in coastal plain from NC to MS (Graves and Pearson, 1973: 188).

cuprascens LeConte, 1852: 65 (as species). Arkansas River; MB MT ND SD/ MN WI/ WY CO/ NE KS IA MO IL IN OH KY/ NM TX OK/ AR LA MS AL TN.

TYPE DEPOSITORY: MCZC.

amnicola Casey, 1913: 37 (as subspecies of *C. cuprascens* LeConte). KY, IL, MO.

TYPE DEPOSITORY: USNM.

mundula Casey, 1913: 37 (as species). MS: Vicksburg.

TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Shelford, 1908: 169; Valenti, 1996b: 46.

TAXONOMY: Acciavatti et al., 1979: 32, and 1992: 53, 71, (fig. 16); Austin, 1879: 223; Blackwelder, 1944: 17; Blatchley, 1910: 31, 35, (fig. 33); Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Bruner, 1901: 98; Cresson, 1861: 11; Criddle, 1925a: 89; Dawson and W. Horn, 1928: 7; Downie and Arnett, 1996: 79, 84, (fig. 3.24); Drew and Van Cleave, 1961: 104, 108, (fig. 9); Eckhoff, 1939: 207, 222; Edwards, J.G., 1949: 73; Fall, 1895: 178; Fleutiaux, 1892: 87; Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 13; Graves and Brzoska, 1991: 4, 5, 27, (fig. 31); Graves and Pearson, 1973: 160, 162, 190, (fig. 30); Harris, E.D., 1911: 54; Harris, E.D. and Leng, 1916: 17; Harvey and Knight, 1897: 79; Horn, G.H., 1876a: 238; Horn, W., 1903a: 187-194, 1915: 394, 1926: 298, 1928: 12, 1930: 86, and 1938: 51, (pl. 82, fig. 19); Hutchings, 1986: 3, 4; Kippenhan, 1990a: 314, and 1994: 23, 76, (fig. 53); Kirk and Balsbaugh, 1975: 13; Knaus, 1884b: 64, 1900a: 114, 1916: 79, and 1926: 263; Knisley et al., 1987a: 281, 282; Kritsky et al., 1996: 29; Lantz, 1905: 259; Larochelle, 1977c: 70, 1979: 13, 1980b: 40, 1987a: 31, 32, 1987b: 54, and 1989b: 42; Larson, P.R., 1981: 52; LeConte, 1852: 65, 1858: 27, and 1860: 49, (fig. 37); Leng, 1902a: 116, 163, 164, 1918: 140, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 94; Mather, 1971: 21; Ortenburger and Hatch, 1926: 143; Pearson et al., 1997: 37; Popenoe, 1877: 22; Rivalier, 1954: 267; Schaupp, 1884a: 83, 100, (pl. 3, fig. 81; pl. 4, fig. c); Schilder, 1953b: 561; Snow, 1878b: 63, and 1903: 192; Summers, 1873: 132; Valenti, 1986a: 1; Vogler et al., 1993a: 142, and 1993b: 376; Wallis, 1961: 65, (pl. 4, fig. 105); Weed, 1892: 278; Wickham, 1911: 5; Wiesner, 1992: 207; Willis, 1967: 252, 254, 1968: 308, and 1970: 3, (fig. 4); Wilson, D.A. and Brower, 1983: 18.

REDESCRIPTION: Leng, 1902a: 164, (pl. II).

BIOLOGY: Acciavatti et al., 1992: 71; Blatchley, 1910: 35; Drew and Van Cleave, 1961: 108; Fender, 1945: 66; Graves and Brzoska, 1991: 27; Graves and Pearson, 1973: 190; Johnson, W.N., 1975b: 34, 1977: 19, and 1978a: 30; Knisley, 1984: 93; Knisley et al., 1987a: 281; Kritsky and Simon, 1995: 145, 146, (figs. 5, 6); Larochelle, 1974c: 24, and 1977b: 51; Lawton and Willis, 1974: 61, 64; Meserve, 1936: 273; Montgomery and Montgomery, 1931: 359; Pearson et al., 1988: 414; Robinson, 1975: 36; Shelford, 1907: 11, and 1915b: 244, (fig. 16); Smyth, 1905: 425-430, and 1908: 184; Townsend, 1886: 48; Vaurie, 1950b: 144; Vogler et al., 1993a: 142; Wickham, 1899d: 222; Willis, 1967: 145.

HABITAT: Banks of rivers; sandbars, especially along large rivers (Graves and Pearson, 1973: 190).

gratiosa Guérin-Méneville, 1840: 37 (as species). North America: Pensacola; LA AL GA SC NC FL.

IMMATURE STAGES: Hamilton, C.C., 1925: 18, 34, (figs. 65, 102, 132); Valenti, 1996b: 46.

TAXONOMY: Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Chaudoir, 1865: 32; Ciegler, 1997: 180, 186, (fig. 24); Cresson, 1861: 13; Engelhardt, 1910: 130; Fattig, 1935: 155; Fleutiaux, 1892: 82; Gemminger and Harold, 1868: 17; Graves and Pearson, 1973: 160, 162, 196, (fig. 33); Harris, E.D., 1911: 58; Harris, E.D. and Leng, 1916. 18; Horn, G.H., 1876a: 240, and

1892: 26, (fig. 7); Horn, W., 1891a: 326, 1915: 396, 1926: 300, 1930: 86, and 1938: 51, (pl. 83, fig. 2); Kirk, 1969: 8; Knisley and Schultz, 1997: 91, 108, (photo. 10); Larochelle, 1979: 13, and 1986c: 38, 45; Lawton, 1970b: 1, 6, 7; LeConte, 1848: 184, and 1860: 59, (fig. 60); Leng, 1902a: 169, 1912: 15, 1915: 561, and 1920: 43; Löding, 1910: 131; Papp, H., 1952: 506; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 103, (pl. 4, fig. 95); Schilder, 1953b: 561; Sherman, F., 1904: 31; Valenti, 1986a: 2; Wiesner, 1992: 207; Willis, 1968: 308.

REDESCRIPTION: Leng, 1902a: 169, (pl. II, IV); Schaupp, 1884a: 103.

BIOLOGY: Cartwright, 1935: 75; Choate, 1975: 75; Graves and Pearson, 1973: 196; Kirk, 1969: 8; Knisley and Schultz, 1997: 97, 108, (photo. 10); Wickham, 1899d: 224; Wilson, D.A., 1975: 49.

HABITAT: Sandhills, gullies and sandy dry streambeds from May through September (Graves and Pearson, 1973: 196).

hamata lacerata Chaudoir, 1854: 115 (as species). FL; ?MS AL FL.

TAXONOMY: Audouin and Brullé, 1839: 132; Blackwelder, 1944: 18; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Chaudoir, 1865: 33; Cresson, 1861: 14; Dunn, G.A., 1984b: 18; Fleutiaux, 1892: 86; Graves and Pearson, 1973: 160, 162, 187, (fig. 27); Harris, E.D., 1911: 57; Harris, E.D. and Leng, 1916: 17; Horn, W., 1893: 339, 1903a: 194, 1903b: 220, 1915: 393, 1926: 297, 1930: 86, and 1938: 51, (pl. 82, fig. 8); Larochelle, 1980c: 47; Lawton, 1970b: 1, 5-7; LeConte, 1860: 48, (fig. 35); Leng, 1902a: 162, 1915: 561, and 1920: 42; Löding, 1910: 131; Mather, 1971: 21; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 99, (pl. 4, fig. a); Schilder, 1953a: 316, and 1953b: 561; Vogler et al., 1993b: 376; Ward, 1989: 34; Wickham, 1899d: 222; Wiesner, 1992: 206; Willis, 1968: 308, (fig. 10).

BIOLOGY: Dunn, G.A., 1984b: 18; Freitag and Tropea, 1969: 20; Graves and Pearson, 1973: 187; Johnson, W.N., 1972: 20; Kritsky and Simon, 1995: 146; Vogt, 1949: 8.

HABITAT: Shell-laden seashore (Johnson, W.N., 1972: 20).

hamata monti Vaurie, 1951: 4 (as subspecies of *C. hamata* Audouin and Brullé). TX: Jefferson Co., 10 mi. SW. of Sabine Pass; TX/ LA MS; Mex. A female allotype is in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Audouin and Brullé, 1839: 132; Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Cazier, 1954: 295; Gaumer, 1969a: 8, 12, (fig. 10); Gaumer and Murray, 1971: 10; Graves and Pearson, 1973: 160, 162, 187, (fig. 27); Kippenhan, 1995b: 54; Mather, 1971: 21; Murray, 1979: 55; Pearson et al., 1997: 37; Schilder, 1953b: 561; Ward, 1989: 34; Wiesner, 1992: 206; Willis, 1968: 308, (fig. 10).

BIOLOGY: Freitag and Tropea, 1971: 54; Graves and Pearson, 1973: 187; Ideker, 1977: 39; Johnson, W.N., 1972: 20, and 1975a: 23, 24; Kritsky and Simon, 1995: 146; Lawton, 1972b: 35, 45; Lawton and Willis, 1974: 63, 64; Murray, 1979: 55; Pearson et al., 1988: 414; Vaurie, 1951: 6.

HABITAT: Wet, dark salt flats in small open places, behind beaches, surrounded by salt grass (Vaurie, 1951: 6).

hirtilabris LeConte, 1875: 161 (as species). FL: near Spring Cove and Hogarth's Landing; GA FL.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Fattig, 1935: 155; Fleutiaux, 1892: 82; Harris, E.D. and Leng, 1916: 18; Horn, G.H., 1876a: 239; Horn, W., 1891a: 326, 1915: 396, (pl. 19, fig. 10), 1926: 300, 1930: 86, and 1938: 51, (pl. 83, figs. 3, 4); Knisley and Schultz, 1997: 91, 111, (photo. 12); Larochelle, 1979: 14; Lawton, 1970b: 1, 3-7; Leng, 1902a: 116, 169, 1912: 15, 1915: 561, and 1920: 43; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 102, (pl. 4, fig. 96; pl. 5, fig. g); Schilder, 1953b: 561; Wiesner, 1992: 208; Willis, 1968: 308.

REDESCRIPTION: Leng, 1902a: 169, (pl. IV).

BIOLOGY: Freitag and Tropea, 1969: 21; Johnson, W.N., 1972: 19; Knisley and Schultz, 1997: 91, 111, (photo. 12); Wickham, 1899d: 224.

HABITAT: Small sandy paths through meadows (LeConte, 1875: 162).

lepida Dejean, 1831: 255 (as species). North America; AB SK MB MT ND SD/ MN WI MI ON PQ/ NV?/ WY UT CO/ NE KS IA MO IL IN OH/ NY PA NJ MD/ MA/ AZ NM TX OK/ AR LA MS AL; Mex.

insomnis Casey, 1913: 35 (as subspecies of *C. lepida* Dejean). KS: Seward Co.

TYPE DEPOSITORY: USNM.

SEX OF TYPE: M.

IMMATURE STAGES: Criddle, 1910: 15, and 1915: 27; Dow, 1916a: 96, and 1916b: 69, (figs. 4, 5, 9); Drew and Van Cleave, 1961: 105, 110; Hamilton, C.C., 1925: 18, 32, (figs. 64, 101, 131); Shelford, 1907: 11, and 1908: 168; Valenti, 1996b: 46.

TAXONOMY: Acciavatti et al., 1979: 32; Anonymous, 1891: 175; Beaulieu, 1900: 154; Beaulne, 1914: 123; Bertholf, 1983: 7, 13, (fig. 10); Blatchley, 1910: 31, 35, (fig. 24); Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 68; Boyd, 1978: 198, 238, (fig. 23); Boyd et al., 1982: 17; Bruner, 1901: 98; Cazier, 1939a: 28, and 1954: 297, (figs. 126, 221); Chaudoir, 1865: 32; Cresson, 1861: 14; Davis, W.T., 1905. 101; Dawson and W. Horn, 1928: 7; Dow, 1917: 45; Downie and Arnett, 1996: 79, 84, (fig. 3.25); Drew and Van Cleave, 1961: 103, 110; Eckhoff, 1939: 207, 223; Edwards, J.G., 1949: 73; Engelhardt, 1912: 296; Evans, J.E., 1903: 240; Fall, 1895: 179; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 82; Fox, W.J., 1900: 101, and 1904: 318; Gaumer and Murray, 1971: 10; Gaumer et al., 1970: 4; Gemminger and Harold, 1868: 20; Glaser, 1984: 66, 68; Goulet, 1983: 17, 22, (fig. 7); Graves, 1963: 496, 501, (fig. 2), and 1965: 68; Graves and Brzoska, 1991: 4, 5, 29, (fig. 33); Graves and Pearson, 1973: 160, 162, 191, (fig. 32); Hamilton, J., 1889b: 104; Harris, E.D., 1911: 58; Harris, E.D. and Leng, 1916: 18; Harris, T.W., 1852: 1; Hilchie, 1985: 323, 333, (fig. 32); Hoffman, 1991: 176; Hooper, 1969: 4; Horn, G.H., 1876a: 239, and 1892: 27; Horn, W., 1903a: 181, 1915: 395, 1926: 299, 300, 1928: 13, 1930: 86, and 1938: 51, (pl. 82, figs. 25, 26); King, B.L., 1988: 44; Kippenhan, 1990a: 314, and 1994: 23, 80, (fig. 56); Kirk and Balsbaugh, 1975: 13; Knaus, 1900a: 114, 1913: 89, 1915a: 35, 1916: 79, 1924b: 171, and 1926: 263; Knisley and Schultz, 1997: 91, 112, (photo. 13); Knisley et al., 1987a: 281, 282; Larochelle, 1975b: 25, 75, 1976a: 77, (fig. 378), 1976b: 73, 77, (fig. 1), 1977c: 67-71, 1979: 14, 1986c: 34-43, 1987a: 21-33, 1987b: 54-57, and 1989b: 45; Larson, P.R., 1981: 52; LeConte, 1848: 181, and 1860: 51, (fig. 41); Leng, 1902a: 116, 169, 170, 1912: 6, 14, and 1920: 43; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 95, (fig. 22); Liard, 1979a: 16; Montgomery and Montgomery, 1931: 359; Nicolay, 1932: 212; Papp, H., 1952: 506; Pearson et al., 1997: 37; Popenoe, 1878: 77; Rivalier, 1954: 266, 267; Robinson, 1948: 27; Schaupp, 1880: 79, 1881: 14, and 1884a: 83, 103, (pl. 3, fig. 90); Schilder, 1953b: 561; Skinner, 1896: 284, and 1909: 185; Smith, J.B., 1891: 221, and 1909: 198; Summers, 1873: 132; Tanner, V.M., 1951: 50; Valenti, 1986a: 2; Wallis, 1961: 14, 67, 70, (pl. 4, fig. 106); Wickham, 1894: 154, and 1911: 5; Wiesner, 1992: 207; Willis, 1968: 308, and 1970: 4, (fig. 11).

REDESCRIPTION: Leng, 1902a: 170, (pl. IV); Schaupp, 1884a: 103.

BIOLOGY: Acorn, 1991: 17, and 1992: 217, 228, (fig. 11.7); Blatchley, 1910: 35; Boyd, 1978: 238; Chapman et al., 1926: 424; Criddle, 1907: 114; Drew and Van Cleave, 1961: 110; Dunn, G.A., 1980b: 167; Fox, H., 1910: 79; Glaser, 1984: 68; Graves, 1963: 496, 501, (fig. 2), and 1965: 68; Graves and Brzoska, 1991: 29; Graves and Pearson, 1973: 191; Harris, E.D., 1913c: 85; Hilchie, 1985: 333; Huber, 1973: 40; Jones, 1884: 76; Knisley, 1979: 211; Knisley and Schultz, 1997: 91, 112, (photo. 13); Knisley et al., 1987a: 281; Kritsky and Simon, 1995: 146; Kuster, 1979: 297; Landry, J.F. et al., 1975: 101; Lantz, 1905: 260; Larochelle, 1974c: 27, 1974d: 66, 1974i: 809, and 1977b: 52; Lawton and Willis, 1974: 48; Leng, 1902d: 239; Liebeck, 1890: 159; Meserve, 1936: 273; Milliger et al., 1971: 41; Shelford, 1911: 584; Smyth, 1905: 426, 427, and 1908: 180; Vaurie, 1950b: 148; Wickham, 1893: 392, 1899d: 224, and 1901: 21; Willis and Stamatov, 1971: 46.

HABITAT: Light coloured sand along ocean, rivers, lakes or dry desert sand dunes such as those east of Samalayuca, or White Sands, NM (Cazier, 1954: 297); a summer species attracted to lights at night (Graves and Pearson, 1973: 192).

macra ampliata Vaurie, 1951: 10, fig. 1D (as subspecies of *C. macra* LeConte). TX: Denton Co., TX. A female allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH (holotype missing).

SEX OF TYPE: M.

TAXONOMY: Bousquet and Larochelle, 1993: 68; Boyd et al., 1982: 17; Huber, 1986: 57; Hutchings, 1986: 3, 4; Robinson and Murray, 1980: 27; Schilder, 1953b: 561; Wiesner, 1992: 207; Willis, 1967: 271.
BIOLOGY: Willis, 1967: 145.
HABITAT: Sides of rivers, dark tan or reddish soils (Willis, 1967: 275).

macra fluviatilis Vaurie, 1951: 8, fig. 1C (as subspecies of *C. macra* LeConte). TX: Hardeman Co., Red River, N. of Quanch; KS/ TX OK/ AR. A female allotype is deposited in AMNH.
TYPE DEPOSITORY: AMNH.
SEX OF TYPE: M.
TAXONOMY: Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Larochelle, 1979: 14; Robinson and Murray, 1980: 27; Schilder, 1953b: 561; Wiesner, 1992: 207; Willis, 1967: 271.
BIOLOGY: Johnson, W.N., 1977: 19, and 1978a: 30; Larochelle, 1977b: 53; Willis, 1967: 145.
HABITAT: Sandy shores of rivers (Johnson, W.N., 1977: 19).

macra macra LeConte, 1860: 50, fig. 39 (as species). WI, MN; SD/ MN WI MI/ WY CO?/ NE KS IA MO IL IN OH? KY/ TX/ AR LA TN.
TYPE DEPOSITORY: MCZC.

mercurialis Casey, 1913: 36 (as subspecies of *C. macra* LeConte). IA.
TYPE DEPOSITORY: USNM.
SEX OF TYPE: M.

topekana Casey, 1916: 31 (as subspecies of *C. macra* LeConte). KS: Mount Hope.
TYPE DEPOSITORY: USNM.

IMMATURE STAGES: Hamilton, C.C., 1925: 19, 49, (figs. 153, 165, 172).
TAXONOMY: Akerlund, 1907: 88; Austin, 1879: 223; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Bruner, 1901: 98; Cresson, 1861: 15; Dawson and W. Horn, 1928: 7; Downie and Arnett, 1996: 79, 84; Durn, G.A., 1987: 11; Eckhoff, 1939: 208, 222; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 87; Gemminger and Harold, 1868: 21; Graves, 1963: 496, 502, (fig. 3); Graves and Brzoska, 1991: 4, 5, 28, (fig. 32); Graves and Pearson, 1973: 160, 163, 191, (fig. 31); Harris, E.D., 1911: 54; Harris, E.D. and Leng, 1916: 17; Horn, G.H., 1876a: 238; Horn, W., 1903a: 193, 195, 1915: 395, 1926: 298, 299, 1930: 86, and 1938: 51, (pl. 82, fig. 20); Huber, 1986: 57; Kippenhan, 1990a: 314, and 1994: 23, 77; Kirk and Balsbaugh, 1975: 13; Knaus, 1900a: 114, 1916: 79, and 1924b: 171; Knisley et al., 1987a: 281, 282; Lantz, 1905: 259; Larochelle, 1977c: 65, 1979: 14, 1980b: 40, 1986c: 42, 1987a: 31, 32, and 1987b: 56; Leng, 1902a: 163, 165, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 94; Montgomery and Montgomery, 1931: 359; Ortenburger and Hatch, 1926: 143; Pearson et al., 1997: 37; Popenoe, 1877: 22; Rivalier, 1954: 267; Schaupp, 1884a: 83, 100, (pl. 3, fig. 83; pl. 4, fig. e); Schilder, 1953b: 561; Summers, 1873: 132; Townsend, 1895: 40; Valenti, 1986a: 3; Vogler et al., 1993a: 142, and 1993b: 376; Wickham, 1911: 5; Wiesner, 1992: 207; Willis, 1967: 253, 269, 1968: 308, and 1970: 4, (fig. 13).
BIOLOGY: Graves, 1963: 502; Graves and Brzoska, 1991: 28; Graves and Pearson, 1973: 191; Huber, 1973: 40; Johnson, W.N., 1975b: 34, and 1977: 19; Knisley, 1979: 211; Knisley et al., 1987a: 281; Larochelle, 1977b: 53; Meserve, 1936: 273; Pearson et al., 1988: 414; Smyth, 1905: 425-429; Townsend, 1886: 47; Vaurie, 1950b: 149; Vogler et al., 1993a: 142; Wickham, 1899d: 223, and 1901: 21; Willis, 1967: 145, 269, and 1971a: 8.
HABITAT: Large moist sandbars beside larger streams and rivers (Graves and Pearson, 1973: 191).

marginata Fabricius, 1775: 226 (as species). VA; NY NJ DE MD VA/ ME NH MA RI CT/ GA SC NC FL; W. Indies.

variegata Dejean, 1825: 84 (as species). North America.

IMMATURE STAGES: Bram and Knisley, 1982: 99; Hamilton, C.C., 1925: 19, 45, (figs. 73, 110, 140); Harris, E.D., 1913b: 80; Spangler, P.J., 1955: 84; Valenti, 1996b: 47.
TAXONOMY: Blackwelder, 1944: 17; Bousquet and Larochelle, 1993: 69; Boyd, 1978: 198, 234, (fig. 21); Boyd et al., 1982: 17; Chaudoir, 1865: 33; Choate, 1975: 74; Ciegler, 1997: 180, 188, (fig. 20); Cresson, 1861: 15; Crowe, 1937b: 80; Davis, W.T., 1912a: 18, 1915c: 154,

1917a: 46, 1919c: 75, and 1919d: 246; Dejean, 1826: 414; Dillon and Dillon, 1961: 51, 58, (pl. V, fig. 10); Downie and Arnett, 1996: 79, 84, (fig. 3.23); Dunn, G.A., 1981a: 4, (fig. 8), and 1986b: 30; Easton, 1909: 36; Engelhardt, 1910: 130; Fabricius, 1781: 286, 1787: 187, and 1801: 241; Fattig, 1935: 155; Fleutiaux, 1892: 86; Fox, W.J., 1903: 337; Freitag, 1992: 154, 158; Gemminger and Harold, 1868: 21; Gistl, 1837: 48; Glaser, 1984: 66, 68; Gould, 1834: 48; Hamilton, J., 1894: 251, 253; Harris, E.D., 1911: 56; Harris, E.D. and Leng, 1916: 17; Harris, T.W., 1852: 1; Hood, L.E., 1903: 115; Horn, G.H., 1876a: 237; Horn, W., 1915: 394, 410, 1926: 297, 311, 1930: 86, and 1938: 51, (pl. 82, figs. 11, 12); Johnson, W.N., 1972: 19, 20; Kirk, 1969: 8, and 1970: 8; Knaus, 1908: 91; Knisley and Schultz, 1997: 91, 115, (photo. 15); Larochelle, 1977c: 68-71, 1980b: 41, 1986c: 35-48, 1986d: 60, 1987a: 27, 29, 1987b: 52-57, and 1989a: 26; Lawton, 1970b: 1-7; LeConte, 1848: 180, and 1860: 48, (fig. 36); Leng, 1902a: 162, (pl. II, IV), 1912: 16, 1915: 561, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 94, (fig. 20); Leng and Mutchler, 1916: 689, 690, and 1917: 194; Linnaeus, 1788: 1922; Melsheimer, 1806: 46; Nicolay, 1932: 212; Olivier, 1791: 725, 733; Pearson et al., 1997: 37; Rivalier, 1954: 267; Say, 1818: 417; Schaupp, 1881: 14, and 1884a: 82, 99, (pl. 3, fig. 80; pl. 4, fig. b); Schilder, 1953b: 561; Sherman, F., 1904: 31; Skinner, 1909: 185; Smith, J.B., 1909: 198; Valenti, 1986a: 3; Vogler et al., 1993b: 376; Wagenaar Hummelinck, 1983: 86, (pl. 4); Weiss and West, 1924: 100; Wickham, 1895: 295; Wiesner, 1992: 206; Willis, 1968: 308, (fig. 8); Wilson, D.A. and Brower, 1983: 18, 31, (fig. 16).

BIOLOGY: Boyd, 1978: 234; Brimley, 1906: 85; Cartwright, 1935: 75; Choate, 1975: 74; Crowe, 1937b: 80; Dunn, G.A., 1978: 2, and 1984b: 19; Fox, H., 1910: 80; Glaser, 1984: 66, 68; Hamilton, J., 1890: 142; Kirk, 1969: 8, and 1970: 8; Knisley and Schultz, 1997: 91, 115, (photo. 15); Kritsky and Simon, 1995: 146; Larochelle, 1977b: 53, 1986c: 42, and 1987b: 51; Liebeck, 1890: 159; Wickham, 1899d: 222.

HABITAT: Mudflats along the coast (Leng, 1920: 163); sandy ocean beach (Freitag and Tropea, 1969: 17-20).

marutha Dow, 1911: 272 (as variety of *C. sperata* LeConte). NM: Fort Wingate; UT CO/ AZ NM TX; Mex.

rubicunda Harris, E.D., 1911: 55 (as variety of *C. cuprascens sperata* LeConte). NM: Albuquerque and Deming.

TYPE DEPOSITORY: MCZC (cotypes).

IMMATURE STAGES: Hadley et al., 1990: 189; Knisley, 1987: 1191; Knisley and Juliano, 1988: 1983; Knisley and Pearson, 1984: 465, 516, (figs. 50-55); Knisley et al., 1989: 179.

TAXONOMY: Acciavatti et al., 1979: 32; Blackwelder, 1944: 17; Bertholf, 1983: 7, 14, (fig. 12); Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Cazier, 1954: 296; Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 55; Harris, E.D. and Leng, 1916: 17; Horn, W., 1915: 395, 1926: 299, and 1930: 86; Hutchings, 1986: 3, 4; Kippenhan, 1990a: 314, and 1994: 23, 79, (fig. 55); Larochelle, 1977b: 53, and 1979: 14; Leng, 1920: 42; Papp, H., 1952: 506; Pearson et al., 1997: 37; Tanner, V.M., 1951: 50; Wiesner, 1992: 207; Willis, 1968: 308, and 1970: 8.

BIOLOGY: Choate, 1975: 74; Hadley et al., 1990: 189; Johnson, W.N., 1975a: 23, 1975b: 35, 1977: 18, and 1978a: 29; Kraus and Lederhouse, 1983: 208; Larochelle, 1974c: 28, and 1977b: 53; Lawton and Willis, 1974: 54, 55; Pearson, 1985: 67, and 1988: 133, 135; Pearson and Juliano, 1991: 225; Pearson and Knisley, 1985: 164; Pearson and Lederhouse, 1987: 249; Pearson and Mury Meyer, 1979: 563; Pearson et al., 1988: 407, 414; Robinson, 1975: 36; Rumpp, 1962: 170; Shelly and Pearson, 1978: 791; Spangler, H.G., 1988: 450; Yager and H.G. Spangler, 1995: 587, and 1997: 649.

HABITAT: Arid country away from rivers, around alkaline lakes, and seepage from springs and cattle watering tanks (Cazier, 1954: 297).

nevadica citata Rumpp, 1977: 175, fig. 1C (as subspecies of *C. nevadica* LeConte). AZ: 8 km WSW. of Willcox; AZ; Mex.

TYPE DEPOSITORY: CASC (type no. 12528).

SEX OF TYPE: M.

TAXONOMY: Bertholf, 1983: 7, 14; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Hutchings, 1986: 3; Sumlin, 1990: 13; Wiesner, 1992: 207.

BIOLOGY: Johnson, W.N., 1978a: 29; Pearson and Mury Meyer, 1979: 562.

HABITAT: Wet flats, at edge of water (Rumpp, 1977: 176).

nevadica knausii Leng, 1902a: 166, pl. IV (as species). KS: Kackley, Belvidere, and Great Spirit Springs; AB SK MB MT ND SD/ WY CO/ NE KS/ NM TX OK.

IMMATURE STAGES: Valenti, 1996b: 47; Willis, 1967: 168, (figs. 47-52).

TAXONOMY: Acciavatti et al., 1979: 32; Bousquet, 1991: 10; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Dahl, 1941: 191; Drew and Van Cleave, 1961: 104, 111; Gaumer and Murray, 1971: 10; Harris, E.D., 1911: 56; Harris, E.D. and Leng, 1916: 17; Hilchie, 1985: 323, 332, (fig. 30); Hooper, 1969: 4; Horn, W., 1903a: 186-196, 1915: 394, 1926: 298, 1930: 86, and 1938: 51, (pl. 82, fig. 18); Kippenhan, 1990a: 312, and 1994: 23, 75, (fig. 52); Kirk and Balsbaugh, 1975: 13; Knaus, 1922: 196, and 1924b: 171; Lantz, 1905: 260; Larochelle, 1979: 14, 1986c: 42; Larson, P.R., 1981: 52; Leng, 1920: 42; Rivalier, 1954: 267; Schilder, 1953b: 560; Snow, 1903: 192; Sumlin, 1990: 13; Wallis, 1961: 14, 17, 67, 70, (pl. 4, figs. 103, 104); Wiesner, 1992: 206; Willis, 1967: 278, and 1970: 4, (fig. 14).

BIOLOGY: Cooper, 1992: 8, 9; Gaumer and Murray, 1972a: 82; Hilchie, 1985: 332; Knisley, 1984: 93; Larochelle, 1977b: 53; Leng, 1902a: 166; Meserve, 1936: 273; Pearson and Juliano, 1991: 224; Pearson et al., 1988: 414; Smyth, 1905: 429; Spomer and Higley, 1993: 392; Willis, 1967: 145, and 1969a: 1.

HABITAT: Wet mud near streams flowing through salt marshes (Leng, 1902a: 166); sandy openings around the shores of a small alkaline stream (Lawton, 1972b: 47; Lawton and Willis, 1974: 48).

nevadica lincolniana Casey, 1916: 32 (as species). NE: Lincoln; NE. A female cotype is deposited in ICCM.

TYPE DEPOSITORY: USNM.

TAXONOMY: Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Horn, W., 1926: 298, 1930: 86, and 1938: 51, (pl. 82, figs. 16, 17); Larochelle, 1979: 14, and 1986c: 42; Leng, 1920: 42; Rivalier, 1954: 267; Schilder, 1953b: 560; Sumlin, 1990: 13; Wiesner, 1992: 206; Willis, 1967: 278.

BIOLOGY: Johnson, W.N., 1975a: 21; Spomer and Higley, 1993: 392; Willis, 1967: 145.

HABITAT: Moist saline roadside ditches, alkaline flats (Lawton and Willis, 1974: 47; Willis and Stamatov, 1971: 47).

nevadica nevadica LeConte, 1875: 159, fig. p. 159 (as species). NV; CA NV; Mex.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Cazier, 1954: 297, (figs. 125, 220); Davis, A.C., 1931: 187; Fleutiaux, 1892: 86; Harris, E.D. and Leng, 1916: 17; Horn, G.H., 1876a: 239; Horn, W., 1903a: 186, 193, 1915: 394, 1926: 298, 1930: 86, and 1938: 51, (pl. 82, fig. 15); Knaus, 1922: 194; LaRivers, 1946: 140; Larochelle, 1979: 14, 1986c: 42, and 1987b: 52; Leng, 1902a: 166, (pl. IV), and 1920: 42; Murray, 1979: 55; Nagano, 1982: 40; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 101, (pl. 3, fig. 88); Schilder, 1953b: 560; Sumlin, 1990: 13; Valenti, 1986a: 3; Vaurie, 1970: 17; Vaurie and Vaurie, 1953: 80; Wiesner, 1992: 206; Willis, 1967: 277, and 1968: 308.

BIOLOGY: Cooper, 1992: 9; Johnson, W.N., 1975a: 22; Larochelle, 1977b: 53; Niemelä and Ranta, 1993: 87; Rumpp, 1956a: 131; Vaurie, 1950b: 150; Willis, 1967: 145, 277.

HABITAT: Fluvial and non-fluvial saline habitats, which occasionally are mesic; larvae: sloping bank, creek bank, small flats near water margin, near hummocks among vegetation (Willis, 1967: 154, 183).

nevadica olmosa Vaurie, 1951: 6, fig. 1B (as subspecies of *C. nevadica* LeConte). TX: Kenedy Co., Los Olmos; AZ NM TX; Mex. A female allotype is deposited in AMNH; and twenty-one paratypes (no. 6078) in SEMC.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: M.

TAXONOMY: Acciavatti et al., 1979: 32; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Byers and Karren, 1968: 3; Cazier, 1954: 297; Gaumer, 1969a: 8, 12, (fig. 11); Gaumer and Murray, 1971: 10; Murray, 1979: 55; Schilder, 1953b: 560; Sumlin, 1990: 13; Wiesner, 1992: 207; Willis, 1967: 278.

BIOLOGY: Gaumer and Murray, 1972a: 79; Huber, 1989: 12; Johnson, W.N., 1975a: 23, 1975b: 35, 1977: 18, and 1978a: 28; Larochelle, 1977b: 53; Lawton and Willis, 1974: 60; Murray, 1979: 55; Rumpp, 1962: 170; Willis, 1967: 145.

HABITAT: Bare salt flats, shores of creeks near water (Gaumer and Murray, 1972a: 79).

nevadica tubensis Cazier, 1939a: 25 (as subspecies of *C. nevadica* LeConte). AZ: Coconino Co., Tuba City; UT/ AZ NM. A male allotype is deposited in AMNH.

TYPE DEPOSITORY: AMNH.

SEX OF TYPE: F.

TAXONOMY: Bertholf, 1983: 7, 15, (fig. 13); Blackwelder and Blackwelder, 1948: 1; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Dobler, 1973: 397; Douglas, 1996: 10; Larochelle, 1979: 14, 1986a: 15, and 1987b: 51; Rotger, 1944: 77; Sumlin, 1990: 13; Wiesner, 1992: 206; Willis, 1967: 278.

BIOLOGY: Schultz, 1986: 146; Willis, 1967: 145.

HABITAT: Muddy shore of Pasture Canyon Lake, a reservoir for irrigation (Lawton and Willis, 1974: 55).

puritana Horn, G.H., 1871: 325 (as species). NH; NY NJ MD VA/ NH MA CT. Two types are in MCZC.

TYPE DEPOSITORY: MCZC (lectotype, ANSP no. 1005).

SEX OF TYPE: M.

TAXONOMY: Austin, 1879: 223; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Davis, W.T., 1912a: 18, and 1915c: 154; Downie and Arnett, 1996: 79, 84; Dunn, G.A., 1981a: 6, (fig. 12), and 1986b: 30; Fall, 1895: 178; Fleutiaux, 1892: 86; Glaser, 1984: 66, 69; Harris, E.D., 1911: 55; Harris, E.D. and Leng, 1916: 17; Horn, G.H., 1876a: 238; Horn, W., 1915: 395, 1926: 299, 1930: 86, and 1938: 51, (pl. 82, fig. 21); Knaus, 1900a: 115; Knisley and Schultz, 1997: 91, 119, (photo. 19); Larochelle, 1979: 14, 1980b: 40, 1986c: 35, 36, and 1986d: 61; Leng, 1902a: 163, 164, (pl. II), 1912: 8, 16, and 1920: 42; Leng and Beutenmüller, 1893: 93, and 1894b: 89, 94, (fig. 21); Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 100, (pl. 3, fig. 82; pl. 4, fig. 6); Schilder, 1953b: 561; Vogler and DeSalle, 1994a: 354; Vogler et al., 1993a: 142, and 1993b: 375; Ward, 1980: 61; Wiesner, 1992: 207; Willis, 1967: 253, and 1968: 308.

BIOLOGY: Dimmock, 1883: 8; Fielding and Knisley, 1995: 61; Glaser, 1976: 17, and 1984: 69; Graves, 1989: 40; Huber, 1989: 12; Knisley and Schultz, 1997: 91, 119, (photo. 19); Larochelle, 1977b: 55, and 1980b: 41; Pearson and Cassola, 1992: 387; Townsend, 1886: 48; Vogler et al., 1993a: 142; Wickham, 1899d: 222.

HABITAT: Banks of rivers along sandy beaches (Wickham, 1899d: 222).

sperata inquisitor Casey, 1897: 298 (as species). TX: Austin.

TYPE DEPOSITORY: USNM.

TAXONOMY: Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Cazier, 1954: 296; Harris, E.D., 1911: 55; Horn, W., 1903a: 190, 193, 1915: 395, 1926: 299, 1930: 86, and 1938: 51, (pl. 82, fig. 23); Larochelle, 1979: 15; Leng, 1902a: 167, and 1920: 43; Rivalier, 1954: 267; Schilder, 1953b: 561; Valenti, 1986a: 4; Wiesner, 1992: 207.

BIOLOGY: Larochelle, 1977b: 55, and 1980b: 42; Leffler, 1975: 27; Robinson, 1975: 36.

HABITAT: Beside streams, rivers and standing water; wet mud banks of creeks (Lawton and Willis, 1974: 62).

sperata sperata LeConte, 1860: 50, fig. 40 (as species). Rio Grande, at various places; UT/ AZ NM TX OK; Mex.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Acciavatti et al., 1979: 32; Bates, 1890: 507; Bertholf, 1983: 7, 24, (fig. 27); Blackwelder, 1944: 17; Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Cazier, 1954: 296, (figs. 124, 219); Cockerell, 1902: 378; Cresson, 1861: 18; Fall and Cockerell, 1907: 155; Fleutiaux, 1892: 87; Freitag, 1966: 942, (figs. 3, 11, 15, 18, 22); Gaumer and Murray, 1971: 10; Gemminger and Harold, 1868: 26; Harris, E.D., 1911: 55; Harris, E.D. and Leng, 1916: 17; Horn, G.H., 1876a: 239; Horn, W., 1892b: 98, 1903a: 187, 193, 1903b: 220, 1915: 395, 1926: 299, 1930: 86, and 1938: 51, (pl. 82, fig. 22); Horn, W. et al., 1897: 183; Hutchings, 1986: 3; Kippenhan, 1994: 23, 79, (fig. 54); Knaus, 1903: 179, and 1904: 153; Larochelle, 1977c: 69-70, 1979: 15, 1980b: 40, and 1987a: 24-32; LeConte, 1858: 27, and 1860: 50; Leng, 1902a: 116, 166, 167, 1918: 140, and 1920: 42; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 102, (pl. 3, fig. 87); Schilder, 1953b: 561; Snow, 1878b: 63; Tanner, V.M., 1929: 87; Valenti, 1986a: 4; Vaurie and Vaurie, 1953: 87; Wiesner, 1992: 207; Willis, 1968: 308.

REDESCRIPTION: Leng, 1902a: 167, (pl. IV); Schaupp, 1884a: 102.

BIOLOGY: Gaumer 1973: 15; Larochelle, 1974c: 32; Lawton and Willis, 1974: 61, 65; Smyth, 1905: 430, and 1908: 182-185; Vogt, 1949: 8; Wickham, 1893: 392, 1899d: 223, 1900a: 82, and 1901: 21.

HABITAT: Banks of an irrigation ditch and along the rocky shore of a small stream (Cazier, 1954: 296).

wapleri LeConte, 1875: 158, fig. p. 158 (as species). MS; LA MS AL GA FL.

TYPE DEPOSITORY: MCZC.

TAXONOMY: Bousquet and Larochelle, 1993: 69; Boyd et al., 1982: 17; Fattig, 1935: 155; Fleutiaux, 1892: 86; Graves and Pearson, 1973: 160, 162, 188, (fig. 29); Harris, E.D., 1911: 56; Harris, E.D. and Leng, 1916: 17; Horn, G.H., 1876a: 238; Horn, W., 1915: 394, 1926: 298, 1930: 86, and 1938: 51, (pl. 82, fig. 14); King, B.L., 1988: 47; Knisley and Schultz, 1997: 91, 136, (photo. 31); Larochelle, 1979: 15, and 1986c: 42; Lawton, 1970b: 1, 6, 7; Leng, 1902a: 163, 165, (pl. II, IV), 1902b: 131, and 1920: 42; Mather, 1971: 21; Pearson et al., 1997: 37; Rivalier, 1954: 267; Schaupp, 1884a: 83, 101, (pl. 3, fig. 83); Schilder, 1953b: 560; Valenti, 1986a: 5; Wiesner, 1992: 206; Willis, 1968: 308.

BIOLOGY: Graves and Pearson, 1973: 188; Johnson, W.N., 1972: 20; Knisley and Schultz, 1997: 91, 136, (photo. 31); Leng, 1902a: 165, and 1902b: 136; Townsend, 1886: 48; Valenti, 1986b: 23, and 1994: 17; Wickham, 1899d: 223.

HABITAT: Pure white sand, which is deposited along banks, and moist sand near water (Graves and Pearson, 1973: 188).

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Subtribe **MEGACEPHALINA** W. Horn 1908 (1915)

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Tribe **CICINDELINI** Sloane 1906

Subtribe **CICINDELINA** W. Horn (1908) 1915

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